Better Homes and Gardens®

WOOD

THE MAGAZINE FOR HOME WOODWORKERS

$3.50

JUNE 1987•ISSUE NO. 17
Display until June 16

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2 shop-tested techniques for routing duplicate patterns in wood

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Fact-filled buying guide for these do-it-all saws

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Expert tips help you design your own central dust-collecting system

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Hand-plane rack
So-sweet settee
Drum-sander holder

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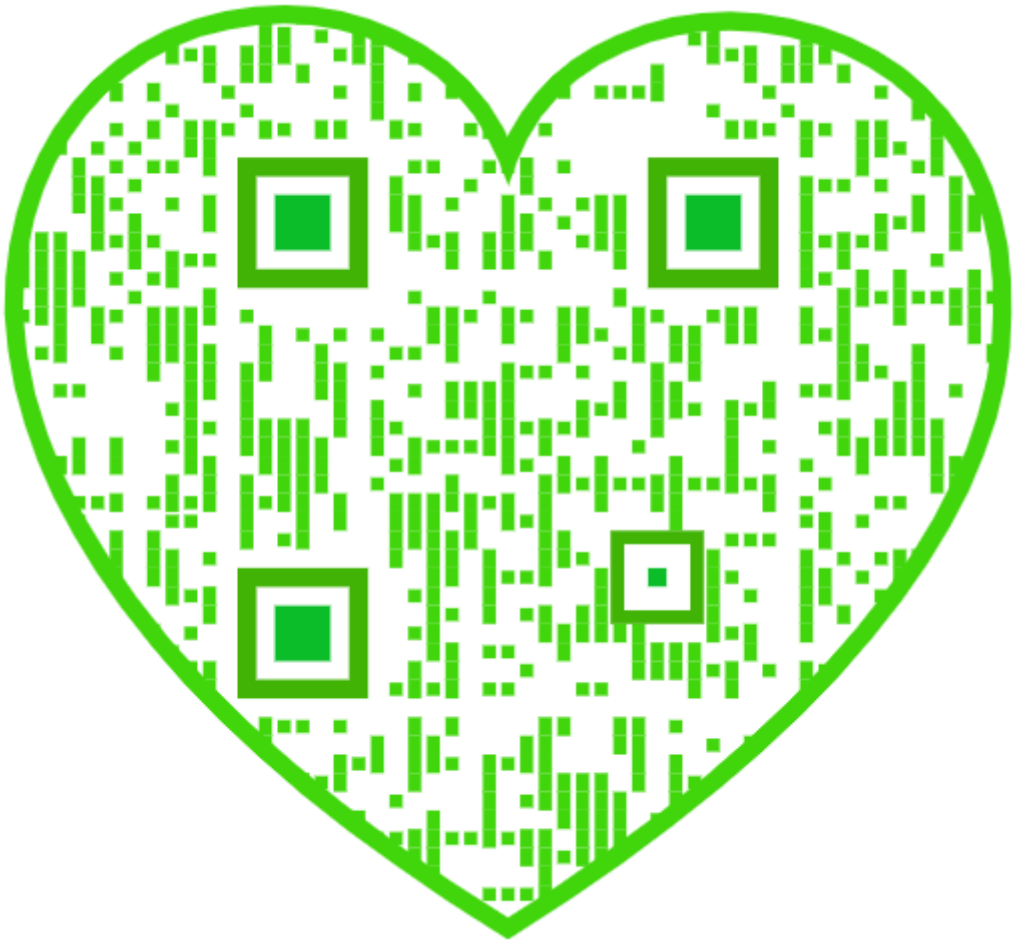

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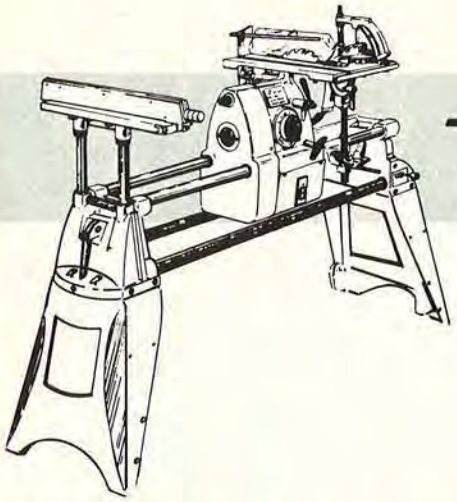

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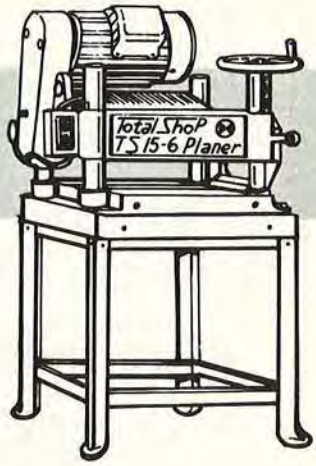

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We used Sitka spruce wood grain in cover logotype of this issue.

JUNE 1987 **ISSUE NO. 17**

WOOD PROFILE

SITKA SPRUCE: THE SOFTWOOD THAT'S STRONG ENOUGH TO FLY 31

Hardy and tall, the "strongman" of softwoods has served mankind in important but unusual ways.

SHOP-TESTED TECHNIQUES

TEMPLATE ROUTING TECHNIQUES 32

Come on, give it a try! We show you two shop-tested routing techniques for duplicating patterns in wood.

DELTA-WING PIN ROUTING ATTACHMENT 38

Ever wonder how those cutting boards and cheese trays with perfectly shaped patterns are made? Wonder no more! With our easy-to-build pin routing attachment and a pattern or two, you can rout all the boards you want.

NOW YOU CAN BUILD IT

STYLIZED MEAT CARVING BOARD 40

Build this great-looking carving board now and have it ready when you do the honors on that next roast, or holiday bird. The Delta-Wing pin routing attachment makes this project a snap to make.

TOOL BUYMANSHIP

RADIAL ARM SAWS — AMAZING VERSATILITY WITHIN ARMS REACH 42

One of these do-it-all saws may be just the tool for you. Here are the options and features to look for, plus a handy buymanship chart.

GOING ALL OUT FOR DUST CONTROL 48

Tired of moving your dust collector from one tool to another? A Minnesota woodworker shows how he solved the problem, and suggests how you can, too.

NOT-SO-PLAIN PLANE RACK 52
Storing your wood planes on a wall rack will help protect your investment and pay off in convenience to boot. Use the plane rack we have in our shop as a guide to build one that suits your needs.

CUMULATIVE INDEX: ISSUES 9 THROUGH 16 53
Looking for a back-issue article? Check our handy, pullout-and-save index. We've compiled all the projects, buymanship advice, techniques, and other topics from these issues.

DRUM-SANDER HOLDER 57
Here's another great shop organizer from the WOOD shop. Let it corral those handy, but often wayward sanding drums and sleeves for you.

SUNBURST DINING TABLE 58
Here we offer you a winning project combination: easy-to-do construction and a beautifully patterned dining table.

HOW THEY MANUFACTURE ROTARY-CUT SOFTWOOD PLYWOOD 64
WOOD visits a plywood mill and shows how modern production keeps softwood plywood strong, versatile, and affordable.

YOU'LL BE SITTIN' PRETTY ON THIS SO-SWEET SETTEE 68
Whether used indoors or out, this durable mortise-and-tenon mahogany bench will serve you admirably.

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MAKING HIS MARK IN MARQUETRY 74
John Wilson brings a centuries-old wood art form into the 20th Century with a contemporary style.

CARVE FRENCH LOUIE 78
A rustic, backwoods Adirondack mountain hermit — the first in a collection of carving patterns from the nation's top carvers.

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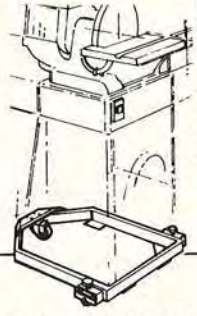

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TALKING BACK

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We welcome your comments, criticism, suggestions...even an occasional compliment. The volume of mail we receive makes it impossible to answer every letter, but we promise to do our level best. Send your correspondence to:

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***WOOD* Magazine**
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MORE FUN WITH FOLK TOYS

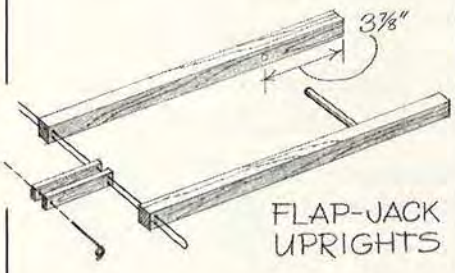
I enjoy *WOOD* magazine, but a couple of your folk toys (*WOOD,* Dec. 1986, p. 48) had mistakes in some of their dimensions. On "Flap Jack", the dimensions indicated the cross dowel should be 3⅞" from the top of the uprights, yet in the photo, the dowel appears 3⅞" from the bottom. Also, the arms on "See Saw" are shown as being 2¾" long, which is way too long to work properly.

By the way, the folk toys turned out well, and my grandkids love them.

— Vince Timboli, Sylmar, Calif.

Vince, you're right on both counts. Our artist flipped the uprights over on "Flap Jack" and no one caught it, except you. The cross dowel should be 3⅞" from the bottom (see drawing at left). And yes, the arms for the men in "See Saw" would be too long at 2¾". Try 1⅞" length instead!

Thanks for alerting us to the errors. Glad though, that all the folk toys turned out alright for the grandchildren. We hope they have many hours of fun with them.



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I made the Climbing Bear from Issue #14, pg. 50. But my two- and three-year old daughters didn't like it. It would hit their knuckles when it came down. To solve this, I tied a second knot six inches up from the first as the new stop for the bear. No more bruised knuckes, and now the bear climbs every day.

— Stephen Cabiroy, Ballston Spa, N.Y.

Your letter proves that even the oldest of folk toys can be improved, Steve. Your addition of the stop knot for Climbing

Continued on page 13

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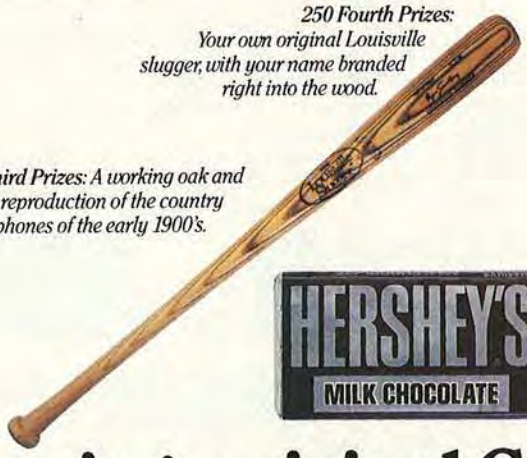

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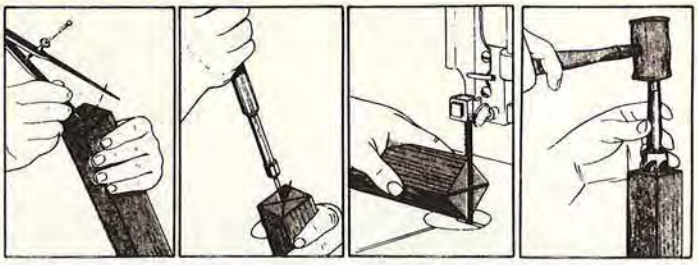

It's easy with master woodworker/craftsman Rosario Capotosto as your step-by-step, start-to-finish guide. Mr. Capotosto is a skilled and prolific how-to writer/photographer who has contributed hundreds of articles to leading do-it-yourself publications. His superb step-by-step photos show you exactly how to create and build exciting new furniture projects *and* how to do basic and fine woodworking techniques with ease, accuracy, and an original professional touch, *even if you're a beginner!*

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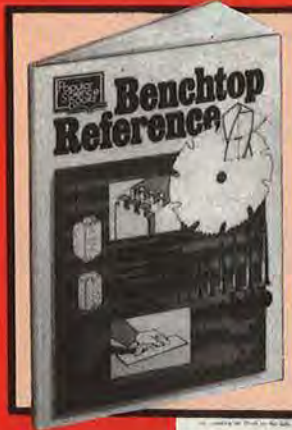

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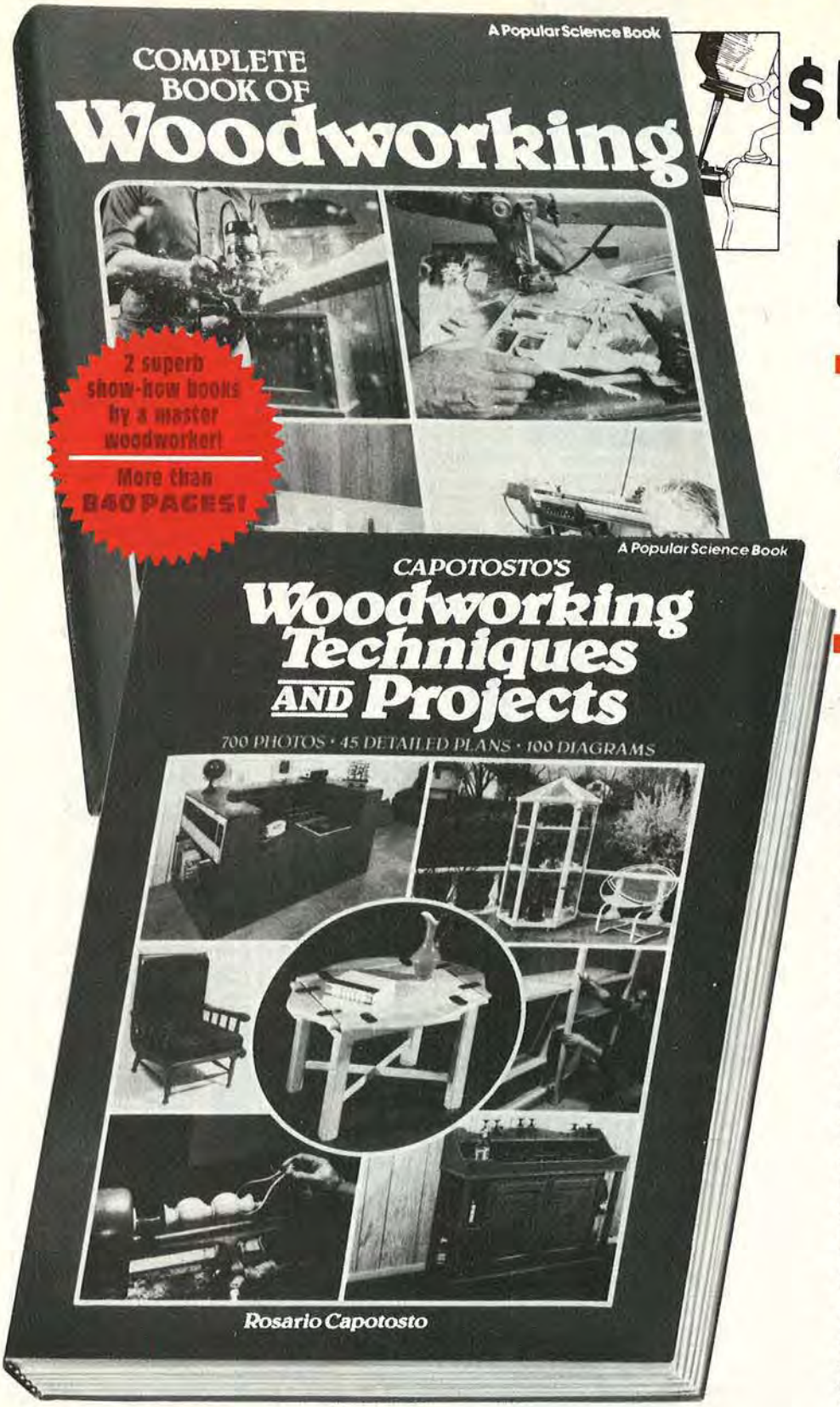
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RYOBI TOOLS

		List	Sale
S500A	3x5½ Finish Sander	70	41
SU6200	Finishing Sand. ½ Sheet	142	88
B7075	3x21" dustless Belt Sand.	179	116
B7100	3x24" dustless belt Sand.	208	140
B7200A	4x24" dustless Belt Sand.	269	165
D100VR	3/8" VSR 0-1200 rpm drill.	91	49
W640	7¼" 13 amp circular saw	158	99
W740	8¼" 13 amp circular saw	171	109
JS60	Jig Saw-Single Speed	172	99
JSE60	Jig Saw-electronic v/speed	198	123
R150	1 H.P. Plunge Router	138	86
R330	2 H.P. Router	220	138
R500	3 H.P. Router	265	163
E3800	Drywall screwdriver 0-4000	126	79
L120U	3⅛" Planer	142	89
BD1020R	3/8" 2-spd Cordless Drill w/free holster-Xtra special buy	148	95
TS251U	10" Mitre Box	300	169
SG1150C	4½" H.D. Mini-Grinder	99	59

YOUR ATTENTION PLEASE!

All Above RYOBI TOOL Prices

Take Additional 10% OFF Sale Prices

MILWAUKEE TOOLS

		List	Sale
0224-1	3/8 drill 4.5A magnum	173	109
0234-1	½ drill 4.5A magnum	173	112
0244-1	½ drill 4.5A magnum	173	115
0222-1	3/8 drill 3.3A 0-100 rpm	159	99
0228-1	3/8 drill 3.3A-0-1000 rpm	139	92
0375-1	3/8 close quarter drill — NEW — 3.5 amp	191	118
0210-1	3/8 cordless drill — NEW — 2 speed	189	95
6539-1	cordless screwdriver — NEW — 190 RPM	99	59
1007-1	½" drill 4.5A D-Hdle	217	145
1107-1	½" drill 4.5A D-Hdle	222	145
3300-1	magnum rt angle drive kit	271	170
3102-1	Plmbrs rt angle drill kit	287	180
1676-1	HD Hole Hawg w/cse 2 sp	363	235
5395	3/8 sgle sp hammer drill kt	203	150
5397	3/8 var sp hammer drill kit	208	155
5371-1	HD mag. hammer drill ½"	313	207
5373	HD mag. ham. drill 3/8"	262	175
6511	2 speed Sawzall w/case	197	122
6226	port band saw 2 sp w/case	416	280
6234	TSC band saw port w/case	416	280
6405	8¼" circ. saw 13 amp	191	127
6460	10¼" " 15 amp w/case	380	245
6165	12" Chop saw 15 amp 4200 R.P.M.	311	189
6255	v/sp Jig Saw 3.8 amp	217	140
6245	sgle sp Jig Saw 3.8 amp	191	125
6012	⅓ sheet HD Orb. sander	173	110
6014	½ sheet HD Orb. sander	184	112
5660	1½ HP router 10 amp	289	175
5680	2 HP router 12 amp	342	220

DRYWALL SHOOTERS

6753-1	3.5 amp 0-4000 rpm **new**	125	79
6747-1	4.5 amp 2500 rpm	157	100
6750-1	4.5 amp 0-4000 rpm	141	90

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MODEL AP-10 — 10" Surface Planer

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LIST 659.00 — SALE 375.00

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Model 0212-1 Cordless Variable Speed 3/8" Drill

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Cuts (80) 2x4's (Pine)

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Univ. Bore — Professional Series

CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
PS203	Gen'l Purp.	7½"	24	27.24	17.50
PS303	Fine cutting	7¼"	40	32.97	20.50

⅝" Bore — Industrial Grade

CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen-l Purp.	10"	40	68.58	34
LU81M010	Gen-l Purp.	10"	40	69.30	35
LU73M010	Cut-Off	10"	60	79.65	36
LU82M010	Cut-Off	10"	60	86.40	44
LU84M010	Combination	10"	40	70.99	36
LU84M011	Combination	10"	50	74.51	37
LU85M010	Super Cut-Off	10"	80	110.88	62
LM72M010	Ripping	10"	24	64.85	34
DS 306	6" Dado			139.00	92
DS 308	8" Dado			170.00	105
TR 100	3 blades & Dado set			399.00	255

MAKITA CORDLESS FESTIVAL OF VALUES

Model		List	Sale
4300DW	Jig Saw	158	99
5081DW	3⅜" Saw Kit	174	95
5600DW	6¼" Circular Saw	224	125
9035DW	Finishing Sander	128	73
6010DWK	3/8" Cordless Drill Kit	152	88
6010SDW	3/8" Cordless Drill	84	45
8400DW	3/8" Hammer Drill	188	105
DA3000DW	3/8" Angle Drill	176	98
6010DL	3/8" Drill w/Flashlight	162	89
6012HDW	3/8" 2 spd Driver Drill w/Bat & Metal Case	178	98
DK1002	3/8" Drill w/Flursnt Lt	164	90
6710DW	Cordless Screwdrvr Kit	148	84

LEIGH DOVETAIL JIGS

Model	List	Sale
TD514	149	125
TD514L	219	195
D1258-12	299	245
D1258-24	359	275

MAKITA BRAND NEW X-TRA SPECIAL

Model	List	Sale
5007NBA - 7¼"Saw w/Elec. Brake	185	115
5008NBA - 8¼" Saw w/Elec. Brake	212	130

MAKITA TOOLS

		List	Sale
BO4510	Sander	86	43
9900B	3"x 21" belt sander	218	119
9924B	3"x 24" belt sander	208	130
9924DB	3"x 24" b/sand. w/bag	234	130
9035	⅓ sheet finish sander	88	48
9045B	½ sheet finish sander	184	90
9045N	¼ sht fin. sand. w/bag	184	105
4200N	4⅜ circ. saw 7.5 amp	168	93
5008NB	8¼ circ. saw 13 amp	198	105
5201NA	10¼ circ. saw 12 amp	398	215
4300BV	v/sp jig saw 3.5 amp	218	120
4301BV	orb v/sp jig saw 3.5 amp	230	125
JR3000WL	2 sp recip saw w/cse	188	120
JR3000V	vs recip saw w/case	198	120

★★★ MAKITA TOOLS ★★★

SPECIAL PROMOTION

LS1000	New 10" Mitre Box	368	198
792210-7A	Carbide Bld for above	49	31
9820-2	Blade Sharpener	268	159
741074-9	60 (coarse) Grdg Whl	33	23
741070-7	1000 (med) Grdg Whl	31	22
741071-5	6000 (fine) Grdg Whl	43	30
1900BW	3¼" planer w/case	178	92
1100HD	3¼" planer w/case	312	160
3608BK	¾ hp router w/case	132	85
3601B	1⅜ hp router	198	115
3700B	½ hp trimmer 28,000 rpm	148	82
BO4530	6" Round Sander	90	48
DA3000	3/8" angle drill	188	105
DP4700	½ v/sp w/rev 4.8 amp	172	92
HP1030W	3/8 v.s.r. hammer drill w/case	158	98
6300LR	½" angle drill w/rev	268	152
8419BB-2W	½" s sp. hammer drill w/case	268	150
GV5000	Disc Sander	98	53
6800DB	2500 rpm 3.5 amp	134	79
6800DBV	0-2500 rpm 3.5 amp	144	89
6801DB	4000 rpm 3.5 amp	134	79
6801DBV	0-4000 rpm 3.5	144	89
2030n	12" planer/jointer	2360	1475
2040	15⅝" planer	1930	1195
1805B	6⅛" planer kit w/case	466	265
JV1600	var. speed jig saw	162	89
JV2000	var. speed orb. jig saw	188	100
5005BA	5½" circular saw 8 amp. with brake	176	98
9207SPC	7" var/speed electronic sander/polisher	238	130
9303BH	4½" sander-grinder kit	146	95
4014NV	var/speed blower	138	79

DELTA — BRAND NEW

Model		List	Sale
34-080	10" Miter Box w/rotary table	279	179

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DELTA — SUPER SPECIAL

40-601	18" Electronic v/sp scroll saw — complete	1117	679

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Model	STANLEY	List	Sale
33-116	PL-316 ¾" x16' Rule	15.95	7.50
33-320	PL-320 ¾" x 20C Rule	16.95	7.95
33-425	PL-425 1" x 25' Rule	18.95	8.95
33-430	PL-430 1" x 30' Rule	20.95	9.95

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#314	4½" Trim Saw	
List 180		SALE 109
#346-1	6½" Top Hdle	
List 161		SALE 100
#617	7¼" Push Hdle	
List 166		SALE 96
#587	7¼" Speedtronic	
List 199		SALE 125
#315-1	7¼" Top Hdle	
List 166		SALE 96
#368-1	8¼" Top Hdle	
List 176		SALE 110

BELT SANDERS by PORTER CABLE

#363 — 4" x 24" w/o Bag — List - 280 Sale - 185

#362 — 4" x 24" w/Bag — List - 295 Sale - 198

#503 — 3" x 24" w/Bag — List - 510 Sale - 350

DELTA

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SUPER CORDLESS SPECIALS from BLACK & DECKER

Model	DRILL KITS	List	Sale
1930	3/8" rev/hi speed	165	110
1950	3/8" High Torque	165	110
5930	Reversible Hammer	179	120
1970	3/8 rev/hi torque screwdriver	179	120
1980	Rev/adj. clutch Scrudrill	179	120

BRAND NEW! SUPER SPECIALS from MILWAUKEE

0214-1	3/8" c/less drive/drill	189	109
8975	H.D. heat Gun, 11.6A Low 570°F - High 1000°F	81	49
5920	belt sander 3x24 w/o bag	315	199
5925	belt sander 3x24 w/bag	315	215
5930	belt sander 4x24 w/o bag	326	209
5935	belt sander 4x24 w/bag	348	214

PORTER-CABLE — NEW ITEMS +

Model		List	Sale
655	Drywall Driver 0-4000 Rev	115	85
367	3¼" Plane 6.5A	170	115
5009	Mortise & Tenon Jig	50	34
351	3" x21" Belt Sander	189	125
352	3" x21" Belt Sndr w/bag	199	135
9810	Cordless Screwdrvr kit	175	115
320	Abrasibe Plane 3A	129	91

★★ ROUTER RIOT ★★ by PORTER-CABLE

Model		List	Sale
100	7/7 H.P. 6.5 amp	141	98
630	1 H.P. 6.8 amp	150	100
690	1½ H.P. 8 amp	194	130
691	1½ H.P. D-Hdle 8 amp	218	145
536	1½ H.P. Speedmatic Double Handle	300	190
537	1½ H.P. Speedmatic Double Handle	315	215
520	3 H.P. Production	460	270
518	3 H.P. Micropressor 5-sp	490	345

TRIMMERS BY PORTER-CABLE

309	3.8 amp laminate trimmer	130	90
310	3.8 amp laminate trimmer	190	135
312	offset base laminate trim	205	140
319	tilt-base laminate trim	215	150

★ X-TRA SPECIALS ★

MAKITA TOOLS

		List	Sale
6010DL	C/less Drill w/flashlight-charger & case	174	90
DP3720	3/8 drill Rev. 0-1800 rpm	98	47
6510LVR	3/8 drill Rev. 0-1500 rpm	136	67
6013BR	½" Drill rev. 6 amp	198	100
5402A	16" Circular Saw-12 amp	518	315
2414	14" Cut Off Saw-13 amp	308	169
3612BR	3 HP Plunge Router	318	175
9401	4x24 belt Sander w/bag	268	160

PORTER-CABLE

		List	Sale
696	H.D. Shaper Table	150	105
695	H.D. 1½ hp Router/Shaper	278	190
399	Drywall Cut-Out Unit	100	70
736	V/Speed *Speedtronic* Band Saw	450	330
7564	½" X.H.D. Drill 8 amp	205	145

BOSCH TOOLS

		List	Sale
1581VS	Top Handle Jig Saw	225	126
1582VS	Barrel Grip Jig Saw	126	118
1604	1¾ H.P. Router	199	118
1942	Heat Gun 650°-900°	99	85
1272	3x24" Belt Sander	259	159
1272D	3x24" Belt Sander w/bag	274	169
1273	4x24" Belt Sander	274	169
1273D	4x24 Belt Sander w/bag	289	179

DELTA

		List	Sale
34-010	Motorized Mitre-Box	231	149

★ NEW LOW PRICES ★ PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
#50	for ¾" Black Pipe	11.23	7.15	79.00
#52	for ½" Black Pipe	9.36	6.10	67.50

JORGENSEN HAND SCREWS

Model	Jaw Length	Open Cap.	List	Sale	Box of 6
#5/0	4"	2"	11.59	7.25	39.15
#4/0	5"	2½"	12.45	8.10	43.75
#3/0	6"	3"	13.36	8.50	45.95
#2/0	7"	3½"	14.36	8.95	48.35
#0	8"	4½"	15.97	9.95	53.75
#1	10"	6"	18.25	11.35	61.25
#2	12"	8½"	20.94	13.60	72.95
#3	14"	10"	26.56	16.75	91.35
#4	16"	12"	34.55	23.75	128.25

JORGENSEN BAR CLAMPS STYLE 37 — 2½" Throat ¼" x ¾"

Model	Jaw Length	List	Sale	Lots of 6
3#3706	6"	7.88	5.50	29.70
#3712	12"	8.73	5.95	32.13
#3718	18"	9.64	6.95	37.53
#3724	24"	10.54	7.35	39.69
#3730	30"	11.76	8.25	44.55
#3736	36"	12.85	8.95	48.33

Who Has The Saws That Cut It Across The Board?

BLACK & DECKER of course!!!

Model	WORM DRIVE SAWS	List	Sale
3050	6½" 12 amp - 4600 rpm	247	169
3051	7¼" 13 amp - 4300 rpm	232	149
3052	8¼" 13 amp - 4300 rpm	247	169

SUPER SAWCATS

3047-09	7¼" w/brake - 12.5 amp	226	149
3048-09	8¼" w/brake - 13 amp	240	155

BUILDERS SAW CAT

3030	7¼" 13 amp - 5800 rpm	155	100
3035	8¼" 13 amp - 5800 rpm	175	125
3034	7¼" 13 amp - 5800 rpm	162	115
3033	6½" 13 amp - 5800 rpm	162	115

JIG SAWS

3157-10	var/sp orb action d/hdl	174	115
3153-10	var/speed 4.5A 0-3100	158	105
3159-10	2/sp orb action barrel grip	178	120

CUT SAW KITS

3103	2 sp 6 amp-2400 strokes	163	100
3105	v/sp 6 amp-2300 strokes	170	110
3107	v/sp orb 6A 0-2300 strokes	183	119
4300	Drill Bit Sharpener	289	205
1321	½" drill 450 rpm 6 amp	175	115
4010	Palm Sander	80	48
4015	½ Sheet Finish Sander	160	105

DRYWALL GUNS

2034	v.s.r. 0-4000 rpm	121	79
2037	v.s.r. 0-4000 rpm	139	89

"Door Openers" from MAKITA

9501B	4" Grinder Kit	119	55
2708	8¼" Table Saw	348	199
5007NB	7¼" Circ. Saw	158	94

MILWAUKEE BUY OF THE YEAR

Model 6365 — 7¼" Circular Saw

List $169.00 Sale $99.00

Lots of 3 — $289.00

***Brand New* • PORTER CABLE**

Model 7548 Top Hdle Jig Saw

LIST 199 — SALE 129.95

Model 7648 Barrel Jig Saw

LIST 199 — SALE 129.95

PORTER-CABLE

9548	HD v/s bayonet saw w/case	255	169
9627	2 sp. tiger saw kit 8 amp	193	130
9629	V/sp. tiger saw kit 8 amp	204	135
505	H.D. ½ sheet finish/sander	175	100
330	spd bloc sander ¼ sheet sz	87	54
304	Professional 7" disc sander	169	120
305	Professional 7" polisher	169	120
7511	3/8" xtrahvy v/s drill 5.2 amp	164	115
7554	½" xtra hvy drill 8 amp	210	150
9652	Versa-Plane Kit	419	285
9118	Porta Plane Kit	289	190

DRYWALL SHOOTERS

7544	5.2 amp — 2500 rpm	158	105
7545	5.2 amp — 0-2500 rpm	158	105

AEG POWER TOOLS

Model		List	Sale
EZ 501	C/less Scrwdrvr **Brand New**	59	35
EZ 502	C/less Scrwdrvr-190 rpm	98	52
EZ 505	C/less Drill/Driver	139	79
EZ 506	C/less Electronic Drl/Drvr	159	94
EZ 581	C/tess Caulk Gun var/sp	179	106
SCR1E	Drywall Screwgun 0-2000	125	74
SCR11E	Drywall Screwgun 0-4000	125	74
BE8RL	3/8" var/sp drill 3.8 amp rev	86	51
BE10RL	3/8" var/sp drill 5 amp rev	125	74
SBE401RL	3/8" Ham Drill v/sp h.d.	88	52
SE2E13RL	½" Ham Drill 2 sp h.d.	169	101
TC25E	Tech Driver v/sp 5 amp	150	89
PC70	7¼" Circular Saw 12 amp	157	93
VS130	Orb Sndr 20,000 OPM ⅓ sh	75	48
VS260	Orb Sndr 25,000 OPM ½ sh	156	88
VSS260	Orb Sndr 25,000 OPM w/bag	189	118
Hbse75S	Belt Sander w/sp 3" x 21"	199	118
BSPE60	JigSaw Orb v/sp 4.6A w/case	214	127
RSK600	Recip Orb Saw 10 amp	229	136

ROTARY HAMMERS

PHE 16RL	3.8 amp 5/8" capacity in concrete	269	175
PH 210	5.2 amp ¾" capacity in concrete	398	260
PHE 20	Same as above — except var/sp 0-750	418	270
PHD 26	6.3 amp 1" capacity in concrete	495	320
PH 38	7.5 amp 1½" capacity in concrete	549	355

All above complete with cases

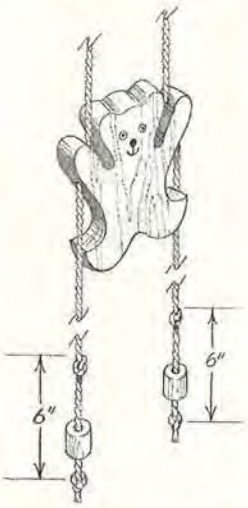
SKIL TOOLS

		List	Sale
551	5½" Circ. saw 6.5A	99	73
77	7¼" Worm Saw	240	135
367	6½" Worm Saw	239	135
825	8¼" Worm Saw	270	165
807	7¼" Skilsaw 13A-Super	153	100
808	8¼" Skilsaw 13A-Super	172	110
2016-02	3/8" Cordless Drill complete W/Charger, Case & 2 batteries	199	95

TALKING BACK

Continued from page 6

Bear should no doubt help keep a lot more bears climbing, and will be appreciated by many WOOD *readers. Thanks for writing and passing on the tip. If anyone else has ideas for improvements, pass them on.*



MATHEMATICS WORKING IN THE SHOP

I am a retired high school mathematics teacher. My favorite was geometry, so I enjoyed reading the shop geometry article in *WOOD* , Dec. 1986, pgs. 54-55. It always interests me to see geometric principles applied in practical ways. All too often I see writers present such solutions as a gimmick or bit of magic. But in truth, they work because of the mathematics.

Your method of finding the center of a circle involves the bisection of the diameter or the direct measurement of it. Using a rule graduated in sixteenths to find the radius might be alright in most instances, but not in all. Let me suggest two, more exact methods:

1. Use the procedure as you describe on page 54 but do it twice, laying the framing square in two random positions. The two diameters will, naturally, intersect at the center.

2. Draw two random chords in the circle. Then construct geometrically, the perpendicular bisect of each cord. They too, will intersect at the center.

— Howard E. Robinson, Lakewood, Ohio

HELPING SPREAD THE WORD

One of the outstanding things that happened to the Easter Seal Society of Iowa's Homebound Training Program this past year was the article "Lending A Helping Hand" in *WOOD* Magazine (Aug. 1986, pg. 29-31). We have received over 50 letters from all over the United States and Canada inquiring about the program as a result of the article. Many of these letters were from physically disabled men

Continued on page 14

DYNASAND™ DRUM SANDER KITS

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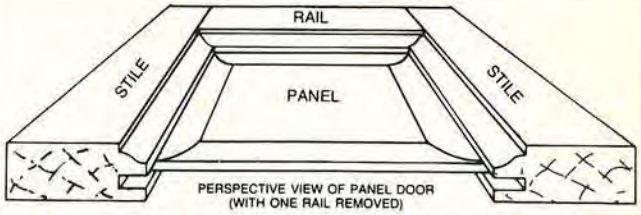

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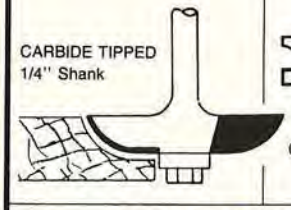

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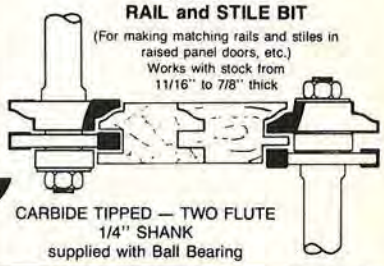

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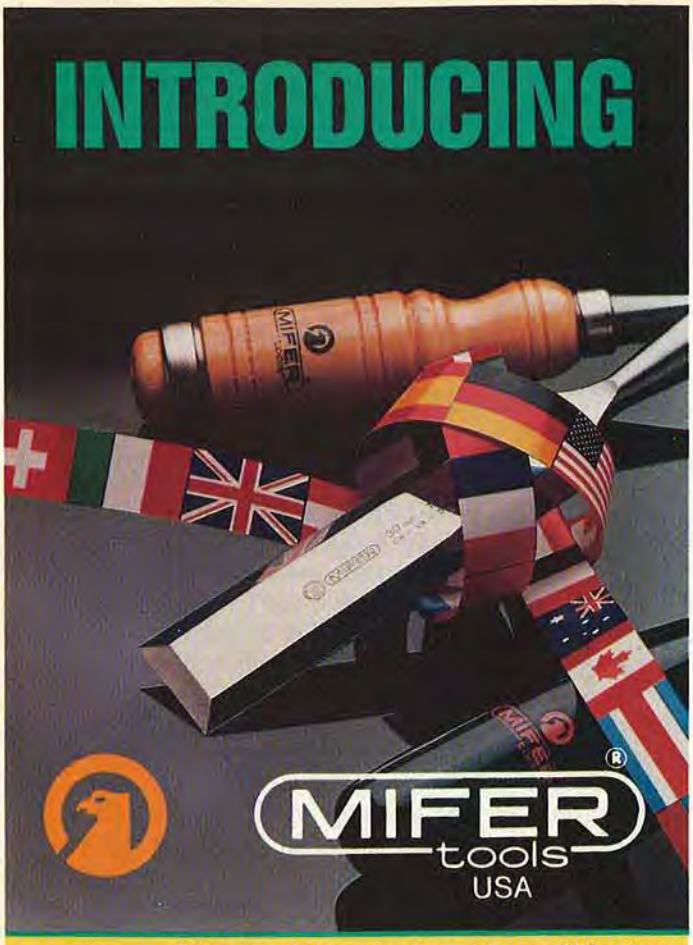

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TALKING BACK

Continued from page 13

wanting encouragement to continue or get started in woodworking. One that stands out in my mind was from a young man in Pennsylvania who had broken his back in a fall while constructing his own home. Others came from professional people working with the disabled. A representative of the Missouri Vocational Rehabilitation Program also visited us as a result of the article.

— Fred J. Kelly, Deputy Executive Director, The Easter Seal Society of Iowa, Inc.

AND THE ADDRESSES ARE —

I am in the process of buying a new band saw for my shop. Your article on band saws has been a great help. But trying to find the addresses of the manufacturers of the saws that interest me, has been a hassle. It would be a big help if addresses were included in the article.

— Thomas S. Elliott, Collegeville, Penn.

Tom, thanks for the gentle nudge — we do include buyers information in the project building articles but the buymanship articles need them too. In the future, we'll include the manufacturer or distributor addresses when appropriate.

THICKNESSER DOESN'T EQUAL PLANER

I have worked around and with heavy woodworking machinery most of my life. There is no such animal as a thicknesser — there are jointers, planers, and bed planers. Please leave the fancy word coinage to the bureaucrats in Washington.

— E. C. McClellan, Denver, Colo.

It seems rather late, after a 100-plus year history of power tools, to have someone confuse people by inventing new names for standard tools. But except for the faux' pas', I enjoy your publication and rate it a 9.5, on a 1 to 10 scale.

— William Dettmer, Crescent, Ga.

A thicknesser? Hoo boy!

— C. O. Phillips, Canyon, Tex.

Woodworking has been a hobby of mine for the past 32 years. From my point of view, if it saws, I call it a saw...if it drills, I call it a drill...if it sands, I call it a sander...and if it planes, I'm going to keep right on calling it a planer!

— Lucian J. Toussaint, Meadville, Penn.

Judging by some of the mail we received, our use of the term "thicknesser" wasn't very popular with some veteran woodworkers. We appreciate hearing from all who wrote to us concerning the article.

Illustrations: Jim Stevenson

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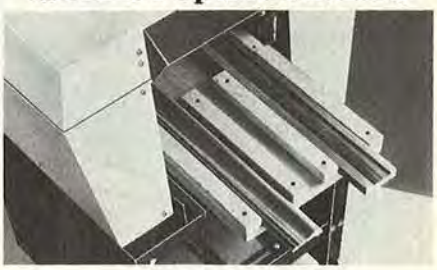

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In woodworking, as in life, no one knows it all. But through experience, we all discover — or stumble onto — better, safer, faster, or easier ways to do things. When we devise interesting tips or techniques, we'll share them with you in this column. And when you send us your favorites, we'll pay you $25 for each submission we publish. No shop tips can be returned. Mail your tips to:

Shop Tips
Better Homes and Gardens®
***WOOD* Magazine**
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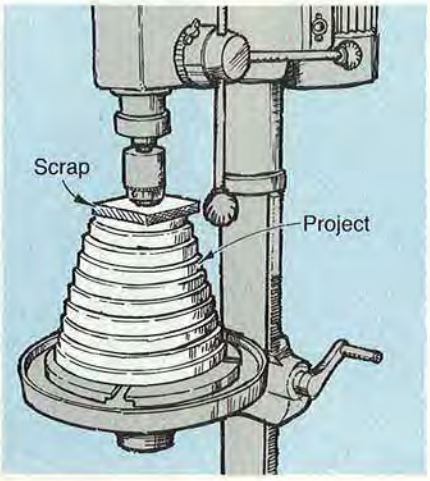
Des Moines, IA 50336

PRESSED FOR A GOOD CLAMP?

Sometimes you just don't have the right size clamp for clamping odd-shaped projects such as ring bowls and vases.

TIP: Use your drill press. Center the workpiece on your drill-press table. Apply pressure with the quill, using a scrap piece of wood in between to protect the project. Then lock the quill in position. This works well on projects where ordinary clamps aren't deep enough to fit.

F.F. Kuhn, Cedarcreek, Mo.

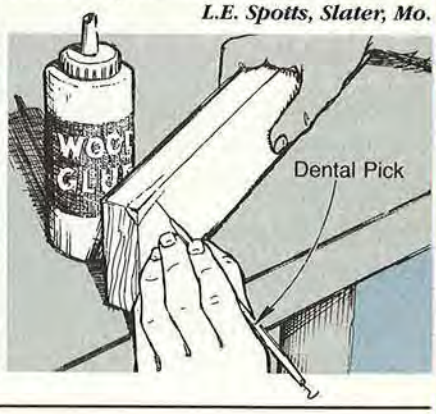


Rx FOR FILLING TINY CAVITIES

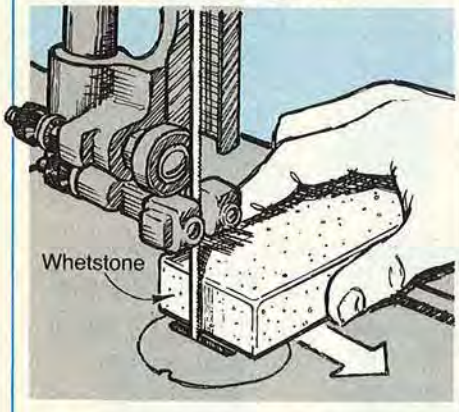
Getting glue into tiny hairline cracks can be tough. Sometimes, even a toothpick may not do the trick.

TIP: At your next dental checkup, ask your dentist if he'll part with some of his worn dental probes — the type with a tough, thread-size wire attached to each end of the handle. With them, you can easily and accurately spread glue into extremely narrow cracks.

L.E. Spotts, Slater, Mo.



GLASS-SMOOTH CUTS

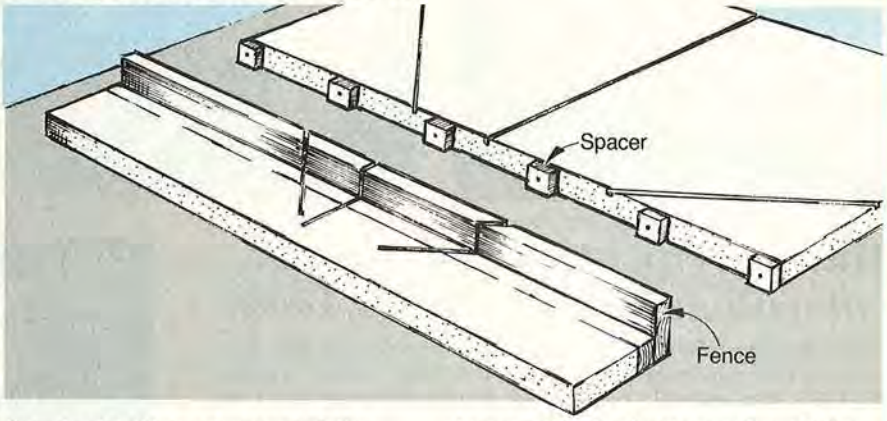


Generally, band saw blades make pretty rough cuts. How can you get smoother cuts?

TIP: This trick works best on ⅛" fine-tooth blades, when cutting stock ¾" thick, or less. To get a super-smooth cut, use a coarse whetstone to hone the sides of the blade as shown in the drawing *above*. This removes the "set" on the teeth. *Note:* After you hone the blade, it will cut slower and won't cut as tight a curve.

From the* WOOD *shop.

CURE FOR SAWDUST PILE-UP



Sawdust piling up against the fence of your radial arm saw table can cause inaccurate cuts. Plus, it's a hassle to stop after every few cuts to brush the dust off the table.

TIP: From a scrap of ¼" birch plywood, cut several spacers 1" long and to a width 1/16" less than the thickness of the front table. Attach the spacers to the back edge of the front table with flat head wood screws, aligning the spacer bottoms with the bottom edge of the table. This leaves the spacers recessed 1/16" below the table surface. Space these 12" apart. Make sure the screw heads are flush with the face of the spacers. Install the fence and back table. Readjust the rip scales on the saw to compensate for the extra ¼" space between the fence and table. Sawdust and chips will fall through the space instead of building up in front of the fence.

Bill Pearce, Jacksonville, Fla.

Continued on page 19

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Problem: How to glue protective felt to the bottom of the statue.
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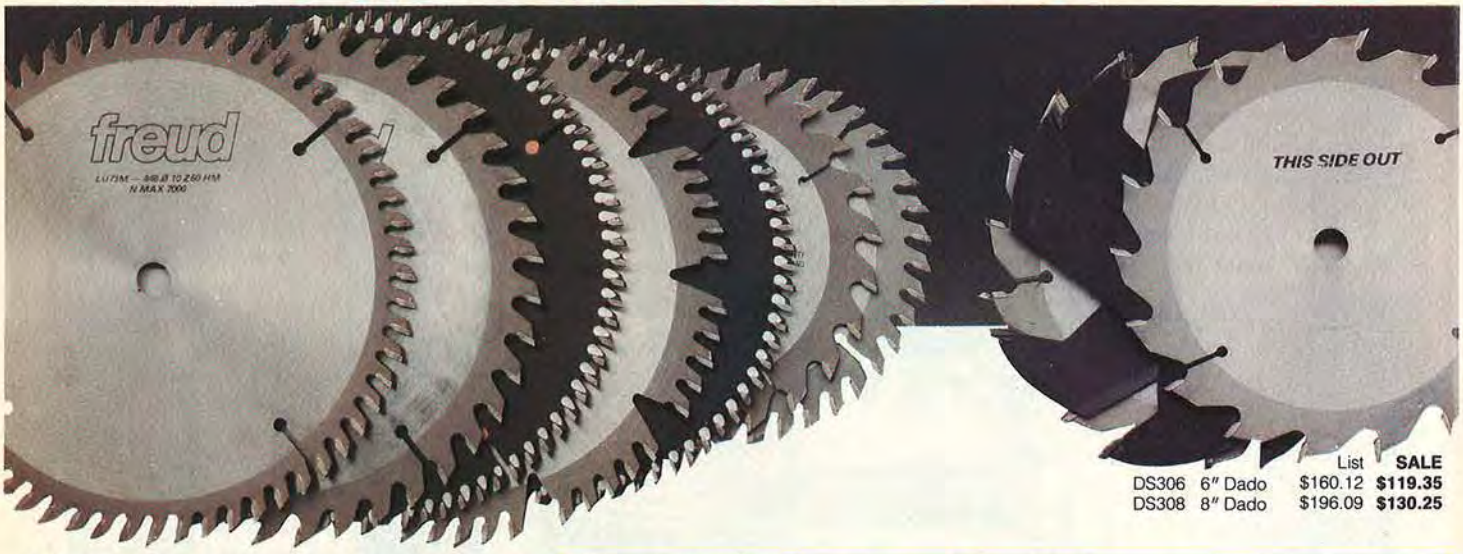

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	LU73M 010						10	60	86.82	**48.95**
Chip Free Cutting Plastic Laminated	LU78M 008	NR	NR	G	E	F	8	64	102.10	**92.65**
	LU78M 010						10	80	127.55	**90.35**
	LU78M 012						12	96	153.55	**126.39**
	LU78M 014						14	108	181.23	**154.75**
Aluminum Cutting	LU80M 008	For Aluminum Cutting Only					8	64	102.10	**71.85**
	LU80M 010						10	80	127.74	**90.45**
	LU80M 012						12	96	156.40	**116.59**
	LU80M 014						14	108	185.34	**147.69**
Precision Cross Cutting For Wood and Veneers	LU82M 008	NR	G	G	G	G	8	48	85.39	**60.99**
	LU82M 009						9	54	94.18	**66.49**
	LU82M 010						10	60	94.18	**52.25**
	LU82M 012						12	72	134.46	**94.79**
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	LU84M 011						10	50	81.22	**48.49**
	LU84M 012						12	60	122.73	**69.75**
	LU84M 014						14	70	146.34	**105.19**
Super Precision Cut Off	LU85M 008	NR	NR	E	E	F	8	64	101.66	**65.39**
	LU85M 009						9	72	111.16	**69.75**
	LU85M 010						10	80	120.86	**80.15**
	LU85M 012						12	96	146.39	**91.55**
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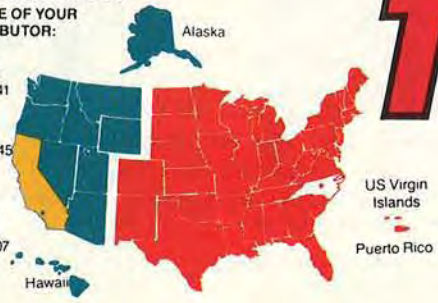

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 16

PERFECT PADS FOR FINISH SANDING

Are you having trouble finding just the right kind of sanding pad for finish-sanding contoured shapes?

TIP: We found that foam paint and varnish brushes of various sizes make excellent backing pads for use with fine-grit sandpapers. Remove the handle and wrap the paper around the pad. The thin, flexible pads provide firm backing for uniform sanding, yet allow the paper to follow the contours of the piece you're working on.

From the* WOOD *Shop

CATCH-ALL FOR OVERHEAD DRILLING

Afraid to look up when drilling overhead with your portable electric drill because you get an eyeful of shavings?

TIP: Slip a Styrofoam or paper cup (cut down to size for short bits) over the drill bit. Pull it back against the chuck so you can see to start the hole. Then push it up and finish drilling the hole. The cup will catch the debris.

Robert G. Fleischman, Verona, Pa.

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PRODUCTS THAT PERFORM

Print this article

Here at *WOOD*, we're always looking for products that make life in the woodshop a bit easier, or make a project a bit nicer. When you find a product that really works for you, you tell your friends, right? That's the purpose of this column. We don't always feature the newest products on the market, but ones we think you, as a woodworker, will be interested in. And we test all of them to make sure they meet *our* standards of performance: we hope they'll meet your requirements, too.

Quick cosmetic job

We'll admit it — we hate the work of stripping and refinishing old furniture. But this easy-to-use three-step kit removes minor blemishes and restores a permanent shine to dull, worn finishes without refinishing. The manufacturer claims you can use it on any interior finish without changing its color. They do not recommend it for scratched, alligatored, or darkened finishes, but for furniture that "isn't bad enough to need refinishing." We found the system quick and effortless, and the resulting finish comparable to a high-quality varnish. And it doesn't produce the toxic fumes associated with paint and varnish removers, so you can use it inside your house.

It takes about one hour to apply the cleanser, buffing compound and finish; another two to three hours for the finish to dry. We recommend going easy with the buffing compound — too much buffing may removed the old finish down to bare wood. The main drawback: although the kit contains enough of each solution to do several small pieces of furniture, you can only use each applicator once, so you have to do all your pieces at one time. *Formby's Furniture Face Lift, $15.99 at home centers and hardware stores that carry Formby's products.*

Super scraper

If you know how and when to use a wood scraper, you'll like this one.

In the *WOOD* shop, we often use this type of scraper, instead of coarse sandpapers in the wood-smoothing process. We like to use it for smoothing glue joints — especially on edge laminations — that would quickly gum up a sanding belt or sandpaper. It operates on the pull stroke. After scraping, you can go directly to a fine-grit paper for final sanding. The blade has two scraping edges — when one side becomes dull, you simply rotate the blade 180° and use the opposite side. You can resharpen the high-carbon steel blades with a flat file and sharpening stone. We've found that the blades hold a good edge; this scraper gets lots of use in our shop.

We like the comfortable feel of the molded polypropylene handle. It gives you positive, precise control over the blade. Available in 1" to 5" blade widths, with 9" or 12" handles. Sample shown has a 1½" blade. *Hyde Scraper cat. no. 10050; available nationwide through hardware stores and home centers that carry Hyde tools. We paid about $3.50 for the scraper shown here.*

Continued on page 24

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 Continued from page 22

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The guide comes complete with a ⅜" countersink drill bit, a Phillips screwdriver bits for use with a variable-speed drill or electric screwdriver, and 24 self-tapping auger-cut screws (these items are also sold separately). It also includes a detailed instruction manual. To use the pocket hole guide, you first attach it to the drill-press table with a C-clamp. Then you adjust the guide angle according to the thickness of the stock you're drilling.

Generally, we found the guide easy to set up and use. However, we do suggest that you drill a few test holes in a piece of scrap wood the same thickness as the stock you'll be drilling, to make sure you have the guide centered. The bit makes clean holes with minimal tear-out. *Portalign Pocket Hole Guide, $34.95 at hardware stores and home centers nationwide. Also may be ordered direct from Portalign Tool Corporation, 4909 Pacific Highway, San Diego, CA 92110-4096.*

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Continued on page 26

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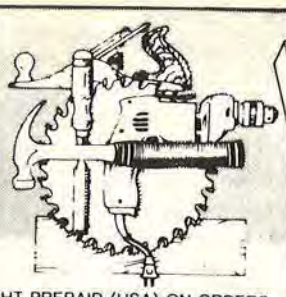

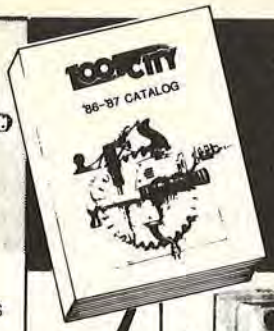

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LM72M010	10X24 Ripping	71	**34**
LU84M010	10X50 Combination	82	**37**
LU85M010	Fine Cut-off	121	**59**
LU78M010	10X80 Plastic TCG	128	**77**
PS203	7¼X24 ATB	30	**17**
PS303	7¼X40 ATB	36	**21**
PS403	7¼X40 TCG Teflon	36	**25**
AD800	8" Adj. Dado	69	**44**
DS306	6" Dado Set	169	**99**
DS308	8" Dado Set	196	**109**
DS310	10" Dado Set	275	**179**
99-034	Lockmitre Router Bit	129	**79**

JS100	Bisquit Joiner	259	**179**
0-10-20	Bisquits 1000		**$29**
CA60PE	Barrel Jig Saw	207	**139**
CA60PEM	Top Handle Jig SAw	208	**139**
LC75	3X21 Belt Sander	207	**139**
LC110	4X24 Belt Sander	277	**189**
CE82	3¼" Planer	207	**139**
LR225	½ Sheet Sander	157	**99**

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		LIST	SALE
AP10C	Planer with Dust Chute Attachment Free Dust Chute Hooks up to any Vacuum!	719	**359**
R150K	1HP Plunge Router with case & Acces	179	**104**
R500	3Hp Plunge Router with all Acces	289	**159**
R501	3Hp Plunge Router with all Acces	299	**169**
R330	2HP Router	249	**149**
TR30U	Laminate Trimmer	139	**69**
S500A	Pad sander	59	**32.95**
SU6200	½ Sheet Sander	189	**99**
TS251U	10" Mitre Saw	359	**169**
TS380	14" Mitre Saw	629	**369**
B7075K	3X21 Belt Sander Kit	209	**109**
B7100	3X24 Belt Sander	229	**119**
B7200A	4X24 Belt Sander	279	**148**

BD10	Cordless Screwdriver	79	**39.95**
BS50N	Resaw Bandsaw	1249	**585***
BS360NR	Resaw Bandsaw	2099	**1150***
AP125	12½" Planer	1999	**895***
AH115	Planer-Joiner	2499	**1150***
RA2500	10" Radial Arm Saw	619	**329***
RA200	8¼" Radial Arm Saw	599	**249**

Makita

		LIST	SALE
1100	3" Planer Kit	328	**189**
1900BW	3¼" Planer Kit	198	**115**
1805B	6" Planer Kit	498	**299**
2030N	Planer-jointer	2580	**Call**
2040	Planer 15 5/8"	2180	**Call**
2708W	8¼" Table saw w/ carbide blade	396	**229**
3601B	D-Handle Router	218	**129**
3612BR	3HP Plunge Router	338	**199**
3700B	Laminate Trimmer	162	**95**
3700DW	Cordless Trimmer	162	**95**
3705	Offset Trimmer	218	**159**
4014NV	VS Blower	168	**109.**
4200N	4 3/8 Saw	182	**109.**
4300DW	Cordless Jigsaw	188	**109.**
4301BV	VS Jig Saw	248	**139.**
5005BA	5½" Saw	192	**118.**
5007NBA	7¼ saw elec Brake	194	**119.**
5081DW	Cordless Saw	212	**119.**
5600DW	6¼ Cordless Saw	284	**169.**
6000LR	3/8" Uni-Drill	218	**134.**
6012DW	3/8" Cordless Kit	208	**109.**
6070DW	VS Cordless	108	**79.**
6092DW	VS Cordless	208	**124.**
6801DBV	Drywall Screwgun	156	**99.**
9030	1" Belt Sander	224	**129.**
9045N	½ sheet Sander w/bag	190	**109.**
9900B	3X21 Belt Sander	234	**139.**
9924DB	3X24 Belt Sander	248	**139.**
B04510	¼ Sht Sander	92	**48.**
B04530	Round Sander 6"	98	**59.**
DP3720	3/8" VS Drill	99	**69.**
DP4700	½" VS Drill	178	**119.**
GE0600	¼" Die Grinder	104	**79.**
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LS1430	14" Mitre Saw	688	**429.**

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		LIST	SALE
1196VSR	3/8" Hammer Drill	$185	**$109**
1198VSR	1/2" Hammer Drill	199	**129**
1272	3X24 Belt Sander	264	**139**
1272D	3X24 Belt Sander w/bag	284	**148**
1273	4X24 Belt Sander	284	**148**
1273D	4X24 Belt Sander w/bag	299	**158**
1288D	1/2" Sheet Sander w/bag	189	**108**
1581VS	T-Handle Jig Saw VS	230	**124**
1582VS	Barrle-grip Jig Saw	215	**119**
1600	D-Hdl 2¼HP Router	359	**239**
1601	1 HP Router	149	**85**
1602	1½HP Router	185	**109**
1603	D-Hdl 1½HP Router	209	**139**
1604	1¾HP Router	233	**149**
1606	D-Hdl 1¾HP Router	209	**144**
1608	Laminate Trimmer	129	**79**
1608T	Tilt-base Trimmer	149	**99**
1609	Offset Trimmer	189	**139**
1609K	Installers Kit w/3 different bases motor & case	269	**169**
1651	7¼" Circular Saw	159	**89**
1920VSRK	3/8" VSR Cordless drill	169	**94**
1921VSRK	3/8" VSR Cordless S'Driver	199	**109**
1942	Hvy Duty Heat Gun	99	**59**
3238VS	VS Orbit Jig Saw	139	**39**
3270D	3X21 Belt Sander w/bag	189	**105**
11202K	Rotary Hammer Kit	599	**379**
11203K	Roto Hmr Kit w/auto stop	639	**439**
90300	3¼ HP Router	500	**329**
90300	3¼ HP Plunge Router	700	**449**

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		LIST	SALE
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309	Laminate trimmer	135	**89**
310	Laminate trimmer	190	**129**
312	Offset Trimmer	205	**134**
314	4½" panel saw	180	**119**
315-1	7¼" saw	172	**99**
319	Tilt base trimmer	221	**139**
320	Abrasive plane	135	**95**
330	¼ sheet pad sander	90	**53**
351	3X21 Belt Sander	189	**126**
352	3X21 Belt Sander w/bag	199	**130**
360	3X24 Belt Sander w/bag	280	**185**
361	3X24 Belt Sander	260	**175**
362	4X24 Belt Sander w/bag	295	**198**
503	Wormdrive w/bag 3X24	510	**336**
504	Wormdrive 3X24	495	**326**
505	½ sheet sander	175	**109**
518	3HP 5spd Router	490	**322**
520	3Hp Production Router	460	**297**
536	1½HP Speedmatic	300	**199.**
621	3/8" VSR Drill	130	**84**
630	1HP Router	150	**94**
666	3/8" T/HDL Drill	165	**115**
690	1½HP Routerw/½"Col	194	**124**
691	1½HP D-Handle Router	218	**139.**
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696	Shaper-router stand	149	**104**
5008	dovetail jig	85	**69**
5009	Mortise-tenon Jig	50	**34**
7511	3/8" VSR Drill	164	**114**
7514	½" VSR Drill	169	**119**
7533	Adj Clutch Screwgun	212	**149**
7545	Drywall Driver	158	**109**
7548	T/handle VS jigsaw	200	**125**
9118	Porta-plane Kit	300	**190**
9314	4½" panel saw kit	209	**139**
9548	Bayonet saw kit	255	**169**
9627	2SPD recip saw kit	193	**123**
9629	VS recip saw kit	204	**132**
9652	Versa-plane Kit	419	**279**
59381	Hinge butt kit	200	**154**
	Stik-It Sandpaper Disp	22	**15**

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TR8	1½HP Plunge Router	206	**119**
TR6	Tilt Base Trimmer	138	**83**
W6VA	VSR Screwgun	133	**79**
CR10V	Orbit recip Saw	224	**107**
C6DA	6¼" Cordless Saw	239	**119**
SB75	2SPD 3X21 Belt sander	198	**139**
SB8T	2SPD 3X24 Belt sander	209	**149**
C10FA	10" DLX Mitre Saw	417	**269**
C15FB	15" DLX Mitre Saw	639	**425**
CJ65VA	Orbit Jig Saw	209	**139**
CB75F	Resaw Bandsaw	2420	**1449***
P100F	12"Planer	1605	**919***
F1000 A	Planer-Jointer	2100	**1249***
R100	Dust Collector	782	**499**

		LIST	SALE
TD514L	12" through Dovetail	149	**125**
TD51L	24" through Dovetail	219	**195**
D1258-12	12" ½ blind & through	299	**245**
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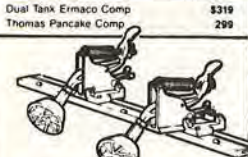

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2000	Improved Dowl Jig	59	**35**
7PC	Brad point drill set		**14**

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T120	Copy Lathe	**940***
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 Continued from page 24

These bits drill a "hole" lot smoother

Drilling the perfect hole can be tough: everything may look OK from the front side as you drill, but what about the back? All too often, when the drill bit breaks through the piece you're drilling, it splits out the wood on the back side, especially in softwoods.

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We got excellent results with these bits — even on softwoods that have a tendency to tear out when drilled. We still suggest clamping the workpiece to a backer board before you start drilling, to minimize what little tearing may occur when the bit breaks through the back side of the hole.

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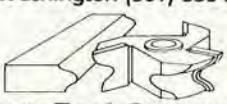

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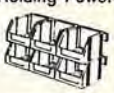

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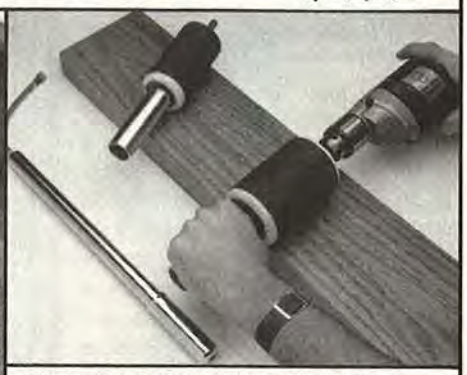

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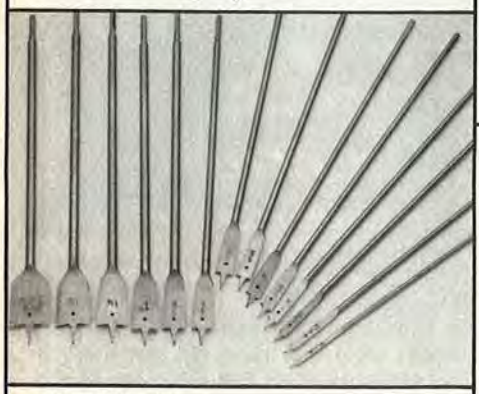

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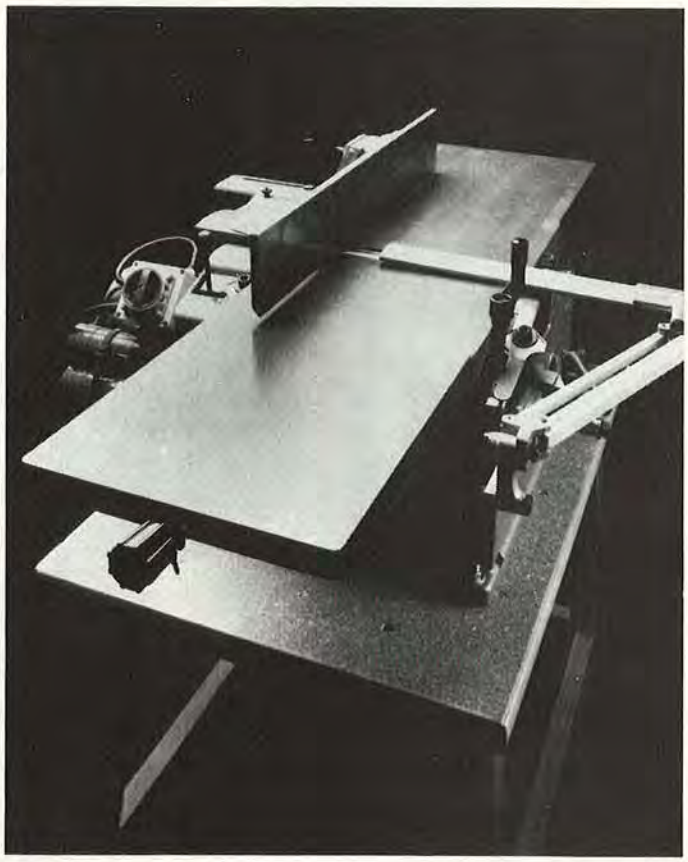

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SITKA SPRUCE

The Softwood Strong Enough To Fly

In the days when Russia claimed Baranof Island, off the coast of present-day Alaska, stands of spruce trees towered over it like 300′-tall sentinels. Botanist August Bongard was so impressed by these trees when he traveled there in the early 1800s that he named them Sitka, after the island's Russian capital.

Sitka spruce, so hardy that it grows farther north than any other conifer, also rates as the "strongman" of softwoods. Indians long ago used its tough root tendrils to sew together their bark canoes.

In modern times, Sitka spruce, with reputedly the greatest strength-to-weight ratio of any wood, took to the air. The famous *Spruce Goose* amphibious airplane, built by millionaire entrepreneur Howard Hughes in the '40s, was made from this wood. So were the frames of some English WW II fighter planes. In air battles they were so small and fast they earned the name "mosquitoes."

Boatbuilders have always found Sitka spruce well suited for masts and oars, and luthiers love it for the soundboards of stringed instruments. However, much of this wood becomes millwork, or is made up into furniture, boxes, and crates. Even larger quantities end up as paper pulp because of the wood's long fibers.

Wood identification

Often called coast spruce and yellow spruce, Sitka spruce *(Picea sitchensis)* stands taller than any of the 18 spruce species found in the Northern Hemisphere. It grows in a coastal area about 50 miles wide and stretching some 2,000 miles from northern California to Kodiak Island, Alaska. It prefers low, wet valleys where the trees grow in dense stands and have no branches for the first 40′ or more.

Sitka spruce heartwood and sapwood

Sitka spruce heartwood

You'll be able to identify Sitka spruce by its size, the scaly, deep reddish-brown or purple bark, and its needles. Unique for a spruce, the needles of Sitka spruce grow flat, sharply pointed, and a bright bluish green. Flexible cones up to 4″ long develop over the summer, finally opening to drop their seeds in the fall. Where the seeds land on moist ground, they readily germinate and grow.

The color of Sitka spruce wood ranges from nearly white to pink to light brown, and sometimes has a candy-stripe look. Heartwood tends to run slightly darker.

Working properties

Very straight-grained, Sitka spruce has less conspicuous growth rings than pine. It's also about 10 percent lighter, weighing 25 lbs. per cubic foot air-dry.

In the shop, you'll find that it works easily with both hand and power tools. It nails, screws, and glues well, and takes a lustrous finish. However, because Sitka spruce is tough and stringy, bandsawing requires sharp, wide blades.

Uses in woodworking

Sitka spruce imparts no taste or gives off no odor, so use it for food canisters, boxes, and butter molds. Its strength and lightness make it perfect for painted furniture and shelving, as well as moldings and doors.

Quarter-sawn so the grain runs vertically, this wood becomes a top choice for the soundboards of guitars, dulcimers, and other stringed instruments. It flexes to aid sound.

Cost and availability

On the West Coast and in the western states, you can buy Sitka spruce at lumberyards. Elsewhere, you have to special-order it, even in thin-cut soundboard stock from specialty suppliers. A top-grade soundboard will cost from $35 to $50. But the price of construction grade Sitka spruce approaches that of pine. Specially sawn, vertical grain lumber may cost $3 a board foot.

Illustration: Steve Schindler
Photographs: Hopkins Associates

Print this article

Production woodworkers swear by them. And so do craftspeople who sell their work at crafts fairs, church bazaars, and shopping malls. But to most other woodworkers, templates remain somewhat of a mystery.

Why do people who depend on woodworking for their livelihood think so highly of templates? Two reasons, actually. First, they know that a correctly made template enables them to make more accurate cuts than would otherwise be possible. And second, with templates, these pros can work quickly without fear of making costly mistakes.

Granted, as a home woodworker, you may not be overly concerned with speed. But if you're like us, you will appreciate the accuracy you can achieve with them.

Once you master the basics of making templates, you'll be able to do all sorts of projects you never thought possible. Say, for example, you want to make a carving board with a decorative pattern carved into it. No problem! You can make one — or a hundred if you want — with a template. And what about signs with your name incised into them? You can do those, too, and they'll turn out great.

Sound like fun? We think you'll find the techniques we cover on these next several pages as intriguing as we did — and just as helpful. Developing this article certainly opened our eyes to many new woodworking possibilities, and we're sure that reading it will do the same for you.

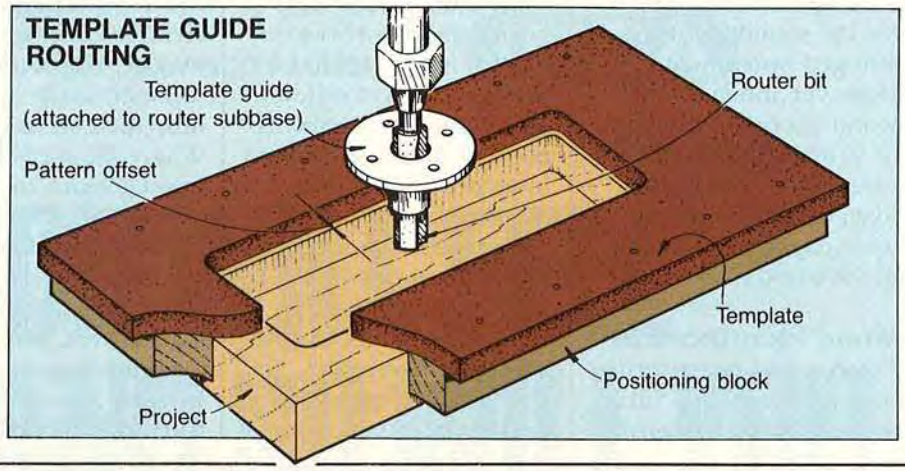
WHAT IS TEMPLATE ROUTING, ANYWAY?

Think of a template as a rigid pattern that defines the shape of the design you are cutting into your project. But a template does more than that. It also controls the cutting action of the router. It just won't allow the router to make a mistake.

We will be telling you about two different techniques in this article — *template guide routing* and *pin routing* with our Delta-Wing Pin Routing Attachment. Though similar, they differ in several key respects. As you can see by looking at the two cutaway sketches below, when template guide routing, the router cuts from above the work. Not so when pin routing with our attachment! Here, a guide pin follows the pattern in the template. You don't even see the cutting action when pin routing.

Also, with template guide routing, the template opening must be slightly larger than the size of the cutouts to be routed. Pin routing templates, on the other hand, duplicate the size of the pattern exactly.

There's one final difference to notice as well. If you use a tem-



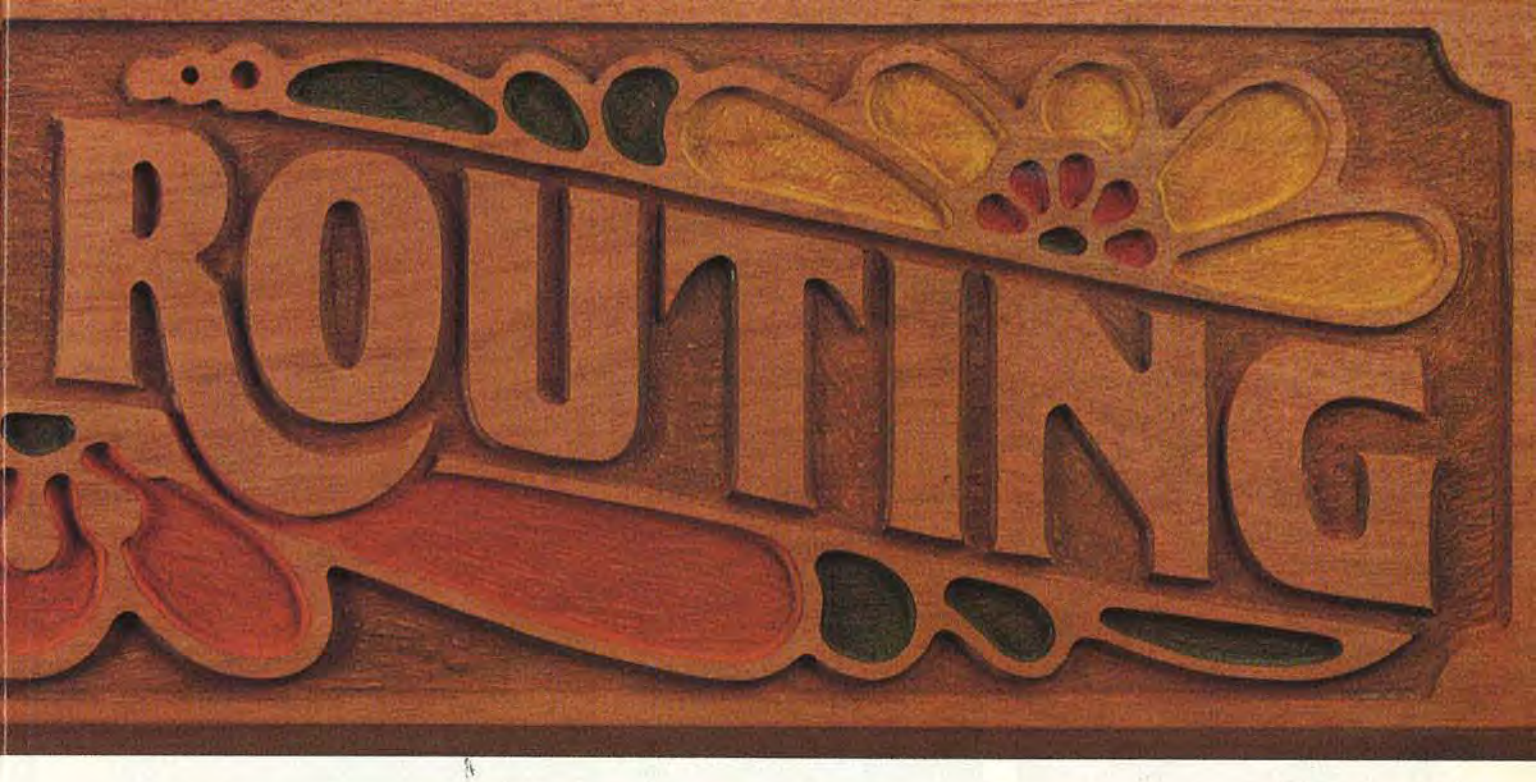


plate guide to make your project, the template itself needs to be somewhat larger than the work to accommodate the *positioning blocks* that hold the work in place.

With pin router projects, you tack the template to a *carrier,* and hold it in place over the work with *double-face tape* and *positioning blocks.* With this technique, the template and the work piece are identical in size.

Each technique has advantages in certain situations. Use these guidelines to determine which technique to use:

- Template guide routing works well with simpler projects *of any size.* Many people rout the mortises for door hinges and make recessed cuts in lettered signs with template guides.
- Use the pin routing technique when you're making more complex creations. The carrier board to which you attach the pattern segments allows much more positioning flexibility than you have with template guide routing. (We made the TEMPLATE ROUTING sign *above* using this technique.)

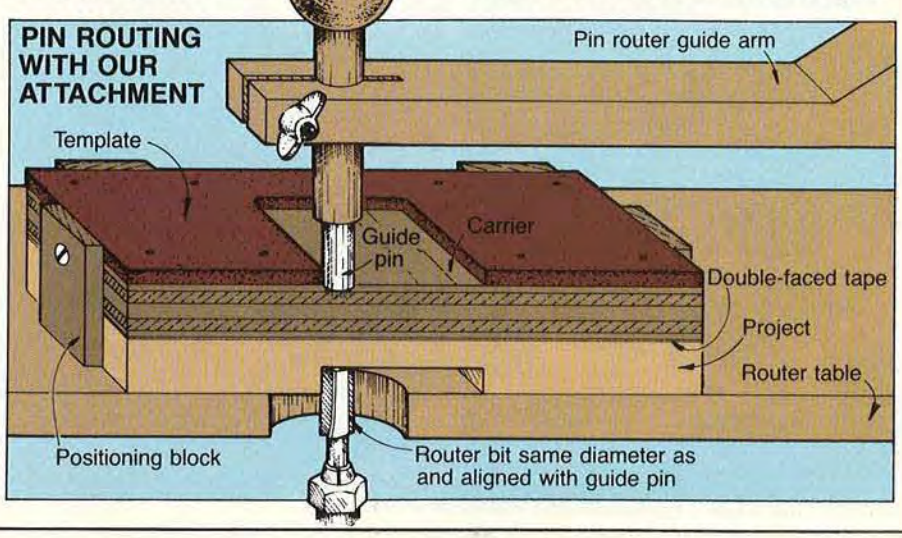
MAKING YOUR TEMPLATE — THE VITAL FIRST STEP

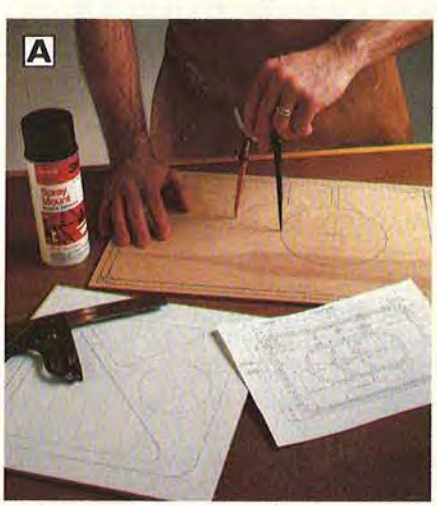
Actually, if you do a good job of making your template, you can hardly go wrong after that. So exercise great care at this stage, the router will do the rest for you.

Both hardboard and plywood — ¼" thick — worked well for us in the shop, but we finally settled on plywood for our templates because it seemed to hold up better over time than did the hardboard. It also was easier for us to see our pattern marks on the plywood.

How to Transfer a Pattern Onto a Template Blank

If you're lucky enough to have a full-size pattern to work from, just spray some artist's adhesive onto a piece of template material and adhere the pattern to it. If you're working with a scaled drawing, you might just as well recreate the pattern right on the template material as shown in photo A.





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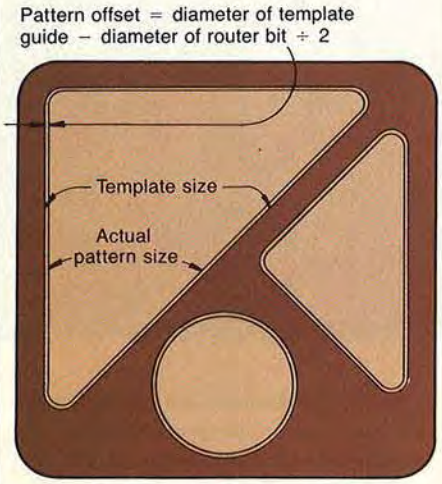
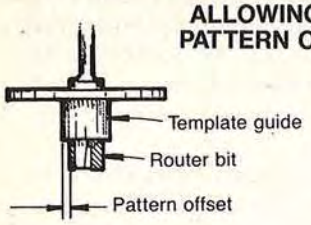
Remember that when you use template guides, you need to offset the lines of the pattern as shown in the sketch below to account for the pattern offset. (The section view shows how the guide rides against the template.)

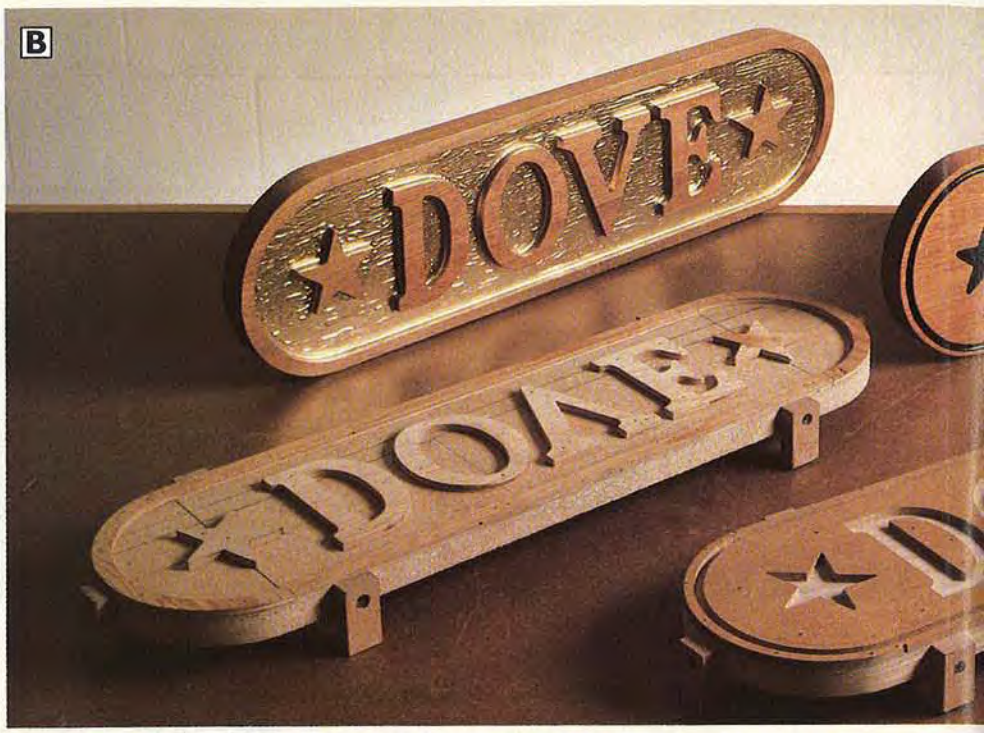


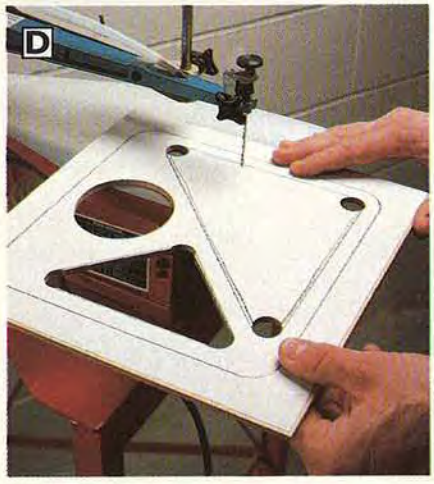


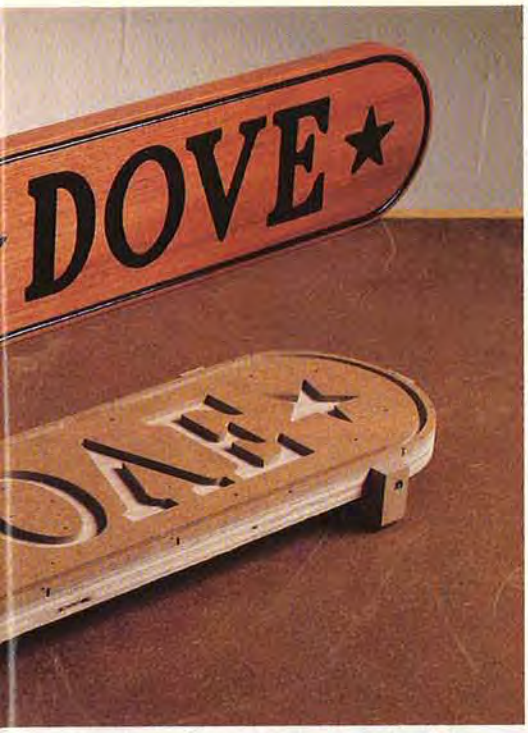
Cutting the Template

During the research phase of this article, something profoundly simple but not very obvious dawned on us. In photo B, we have two finished signs with the corresponding template in front of each. Note that if you want to create a raised image, you need a raised template. But if you're working with a recessed design, cut that part of the template away.

Note: *You cut the template material the same no matter whether you're pin routing or using template guides. But keep in mind that template guide routing requires that you leave an extra inch all around the pattern so you can attach the template to the positioning blocks. If pin routing, make the template and carrier the same size as the work.*







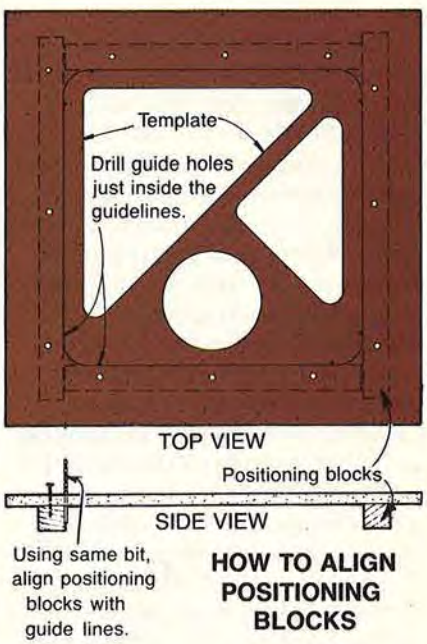
Try to machine as much of the template as possible — you'll be much more accurate that way. Drill curved areas with drill bits and circle cutters. And once you've done that, use a saber saw or a scrollsaw to cut within ¼" of the straight lines (we show both of these operations in photos C and D).

To true up the straight lines, tack a straight piece of scrap wood to the template material as shown in photo E. Place one edge of the straightedge on the pattern line. Then, using a flush-trimming router bit, shear off the excess material.

And to smooth out any minor irregularities, sand all edges. As you can see in photo F, we use sandpaper-covered dowels for the corners and a flat sanding block for the straightaways. (We purchased automotive-type adhesive-backed aluminum oxide abrasive from a local auto supply house.)

Also, check to see if there are any voids in the edges of the template material, as these can cause you problems when the router guide passes those points. Fill all voids with 5-minute epoxy mixed with sawdust, as shown in photo G. You'll find this same technique helpful if you happen to nick the template while routing.

Now, if you're template guide routing, drill small guide holes near each end of each side of the template material (you want the holes inside but touching the perimeter lines). Then, using the bit as a guide, as shown in the sketch below, slide the positioning blocks into position under the template material, one side at a time, and nail the template to the blocks.



HOW TO ALIGN POSITIONING BLOCKS

For pin router projects, position the template on the carrier, pattern side down, then nail it (or the several pieces that make up the template) to the carrier. Believe us, it's easy to get confused when positioning the template on the carrier. We found that to read the template from the bottom — like the router bit does when it's cutting — you need to view it in a mirror, as shown in photo H. (We thought of

Continued

this only after we layed out a carving board template backwards, which just goes to show you that necessity is definitely the mother of invention.)

ROUTING YOUR PROJECT — THE TEMPLATE GUIDE METHOD

Start by fitting your router subbase with the same template guide you used to figure the pattern offset. (We made a large-diameter clear acrylic base to allow the router to span the template openings.) Keep in mind that the sleeve portion of the guide must be as short as, or shorter than, the thickness of the template material. (Since we were using ¼" stock, we cut a hole in a scrap piece of template material to accommodate the guide, inserted the sleeve into the hole, and ground the sleeve flush with the template.)

Now, referring to the Router Bit Box at *right*, select the appropriate bit for your project, and set the depth of cut to ¼" or less as shown in photo I. You'll find that making several shallow passes is much easier on the router. And, you don't run near the risk of shaking the bit loose and causing deeper-than-desired cuts.

You'll need both hands to control the router, so use double-faced tape to hold the work securely to the work surface. After positioning the template over the workpiece, tip the router bit into the work as shown in photo J. (We were careful to keep the bit away from the edge of the cutout.)

The sketch at *right* shows the cutting sequences to follow when you rout out the recesses. First, cut around the perimeter of each recess. Then rout the field area with the grain. If you use a pointed or a rounded router bit to clean the field area, the finished surface will look hand-carved. For a smoother surface, fit a larger-diameter template guide into the router subbase to increase the offset, and clean the field with a straight or mortising bit.

ROUTER BITS USED FOR TEMPLATE WORK

BIT	SIZES	USES
Straight	⅛-¾"	Cuts flat bottoms, square with walls.
Mortising	½, ¾"	Same as straight, but cuts smoother bottom.
Veining Core box	⅛-¾"	Cuts round-bottom grooves. If used to cut field areas, it leaves a bottom that looks like it was carved with a gouge.
V-grooving	¼, ½, ¾"	Decorative cuts; good for recessed letters.
Bottoming	½, ⅝, ¾"	Use to smooth up bottoms already routed with another bit.
3-in-1	7/16, ¾"	Cuts a straight wall radiused into a flat bottom.
Keyhole	⅜"	Cuts a flat bottom with a lip overhanging on the side wall. Use for keyhole slots and recessed drawer pulls.
Pilot pan	¼"	Use with guide bushings only. Cuts openings through thin panels and plastic laminates.

ROUTING OUT RECESSES USING TEMPLATE GUIDES

STEP 1
Lower the bit into the project away from the template. Then, cut around the perimeter.
Field area
STEP 3
Clean up router marks with a sharp wood chisel and sandpaper.
STEP 2
Rout field area with the grain.

***Note:** the 3-in-1 bit shown in the chart will produce a straight wall radiused into a flat bottom without changing template guides.*

Wood chips pile up in a hurry when hollowing-out recesses. To keep track of your progress and to prevent chips from building up in corners a situation that, can hamper cutting performance, stop periodically and blow out the accumulation. And when you're through routing, you'll need to clean up any remaining router marks with a sharp wood chisel and sandpaper.

ROUTING YOUR PROJECT — THE PIN ROUTER METHOD

To employ this technique, you'll need either an overarm pin router or the Delta-Wing Pin Routing Attachment we show you how to build on pages 38.

To set up our Delta-Wing Pin-routing Attachment, first insert the required number of spacers between the router table and the arm of the attachment. You'll want to position the arm slightly above the template. Now, fit the alignment pin through the opening at the end of the arm and insert it into the router collet. Tighten the wingnuts beneath the spacers to secure the attachment directly over the router collet as shown in photo K.

With this done, remove the alignment pin and insert a guide pin into the hole in the arm. This pin must be the same diameter as the router bit you'll use.

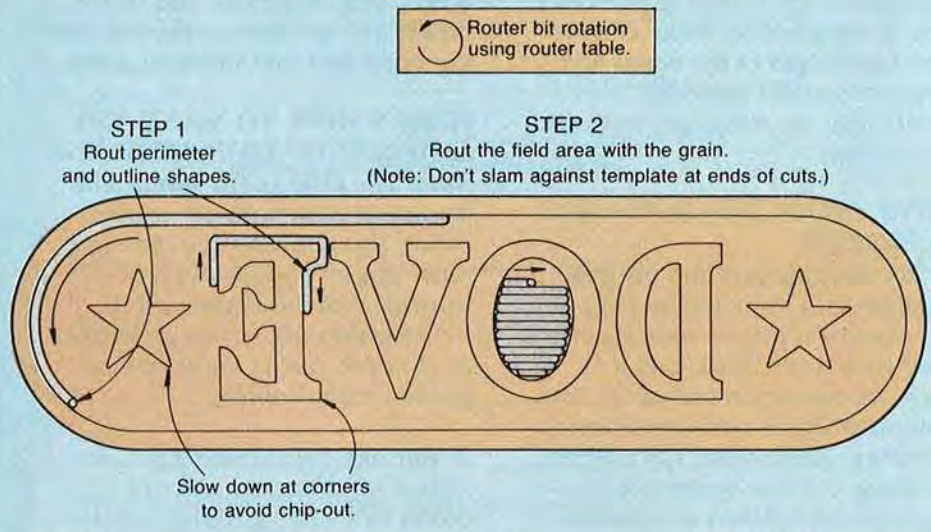
Lower the collet to below the work surface, and raise the arm. Then slide the template, carrier board, and workpiece into position, and lock the guide pin so it fits snugly against the carrier (see photo L). Now, raise the arm and slide the template out of the way.

Select a router bit that's the same diameter as the guide pin, and tighten it in the collet. Now, raise the bit up to a cutting height of ¼" or less, position the work over the router bit, start the router, and slowly lower the work onto the spinning bit. Note that the guide pin needs to be in one of the recesses in the template to control the cutting action (see photo M). Once you have the work flat on the work surface, flip the hold-down into its closed position. (This lever prevents the guide pin from jumping up and out of its recess.)

The sketch at *left* shows the cutting sequence to use when pin routing. Here again, rout the perimeter first, then outline any shapes, and clean the field area with the grain. To prevent mishaps such as chip-out at corners and damage to the template, be sure to slow down at corners, and don't slam against the template at the ends of cuts.

The same advice we gave earlier for cleaning up the bottom of the recesses applies when using the pin-routing attachment, too. A rounded or pointed router bit will yield a hand-carved look, whereas a straight or bottoming bit will result in a much smoother surface. Keep in mind that changing to a larger-diameter guide pin and a smaller-diameter straight bit allows you to clean the field area without cutting away the coved edges.

ROUTING TECHNIQUES USING THE PIN ROUTING ATTACHMENT


Router bit rotation using router table.
STEP 1
Rout perimeter and outline shapes.
STEP 2
Rout the field area with the grain.
(Note: Don't slam against template at ends of cuts.)
Slow down at corners to avoid chip-out.

Produced by Larry Clayton with James R. Downing
Photographs: Hopkins Associates
Illustrations: Bill Zahn

DELTA-WING PIN ROUTING

BUILD IT ONCE, USE IT AGAIN AND AGAIN...

Have you ever wondered how those cutting boards or cheese trays with perfectly shaped patterns are made? Well, wonder no more! With our pin routing attachment and a pattern or two, you can rout all the carving boards (see ours on page 40) or other projects you want. You'll probably never have to buy another wedding or Christmas gift again, ever.

***Note:** The attachment fits our router tabletop which measures 12[illegible]8". If your table is smaller, you'll need to shorten the arm and reposition the mounting holes.*

LET'S START WITH THE ARM AND WINGS

1 To make the arm (A), cut two pieces of ¾" birch to 2¾x16" (we used Baltic birch plywood). Glue and clamp the pieces together face to face.

2 Scrape off the excess glue, and then trim or plane the edges for a 2⅝" finished width. Trim the arm to length (11¼"), and save the scrap — you'll use it later for the hold-down (D).

3 Bore a ¾" hole 1⅛" from one end, centered from side to side, in the arm where shown on the Exploded-View Drawing. Drill a ¼" hole perpendicular to the ¾" hole ⅜" from the same end.

4 Using a band saw, cut the arm to the shape shown on the drawing and sand smooth. Cut a ⅛" kerf 2¼" long centered on the joint line between the two As, again referring to the drawing.

5 To make the wings (B), cut a piece of plywood to 7x9⁷⁄₁₆" long. Draw a diagonal across it, and cut down the center of the line to form the two wings. Cut a 3"-diameter hole in each wing where located on the drawing.

6 Cut or rout a ¾" stopped groove ⅜" deep and 8⅞" long, centered along both side edges of the arm. (We clamped a stop to the rip fence and made our grooves on the table saw with a dado blade. If you follow this process, sand the front edge of each wing to match the radiused end of the stopped groove.)

7 Glue and clamp the wings into the grooves in the arm (for clamping, we used a hand screw and positioned the clamping parts in the 3" wing holes). Make certain the back edges of the wings and arm are straight and flush. Also, check that the wings are level with each other.

NOW, MAKE THE SUPPORT ASSEMBLY

1 Cut four spacers and the top support (C) to size. Dry-clamp the five pieces together with the edges and ends flush. Then, drill a ⅜" hole through each end of the lamination where dimensioned on the drawing. Remove the top support, reclamp the four spacers, and enlarge the holes in the spacers with a ½" drill bit.

2 Cut the hold-down (D) to size from the scrap left over from the arm lamination. Bore a ½" hole ¾" deep in the hold-down where shown on the drawing. Sand a slight taper on the bottom front edge of the hold-down. The taper makes it easier for the hold-down to force the arm down for routing.

3 Clamp a 1½" wooden ball (available from toy-part suppliers) in a hand screw, and bore a ½" hole ½" deep into it. Cut a piece of ½" dowel to 2". Glue one end of the dowel into the hole in the ball, and the other end into the hold-down.

HERE'S HOW TO MAKE THE GUIDE AND ALIGNMENT PINS

***Note:** The* **alignment pin** *aligns the attachment with the router collet. You can also use the alignment pin as a guide pin when routing with ¼"-diameter bits.*

The **guide pin**, *when positioned in the arm, tracks the template pattern when routing.*

1 To make the alignment pin, shown at *right*, cut a piece of ¾" dowel to 4⅞" long. Using a drill guide block (see the Drill Guide

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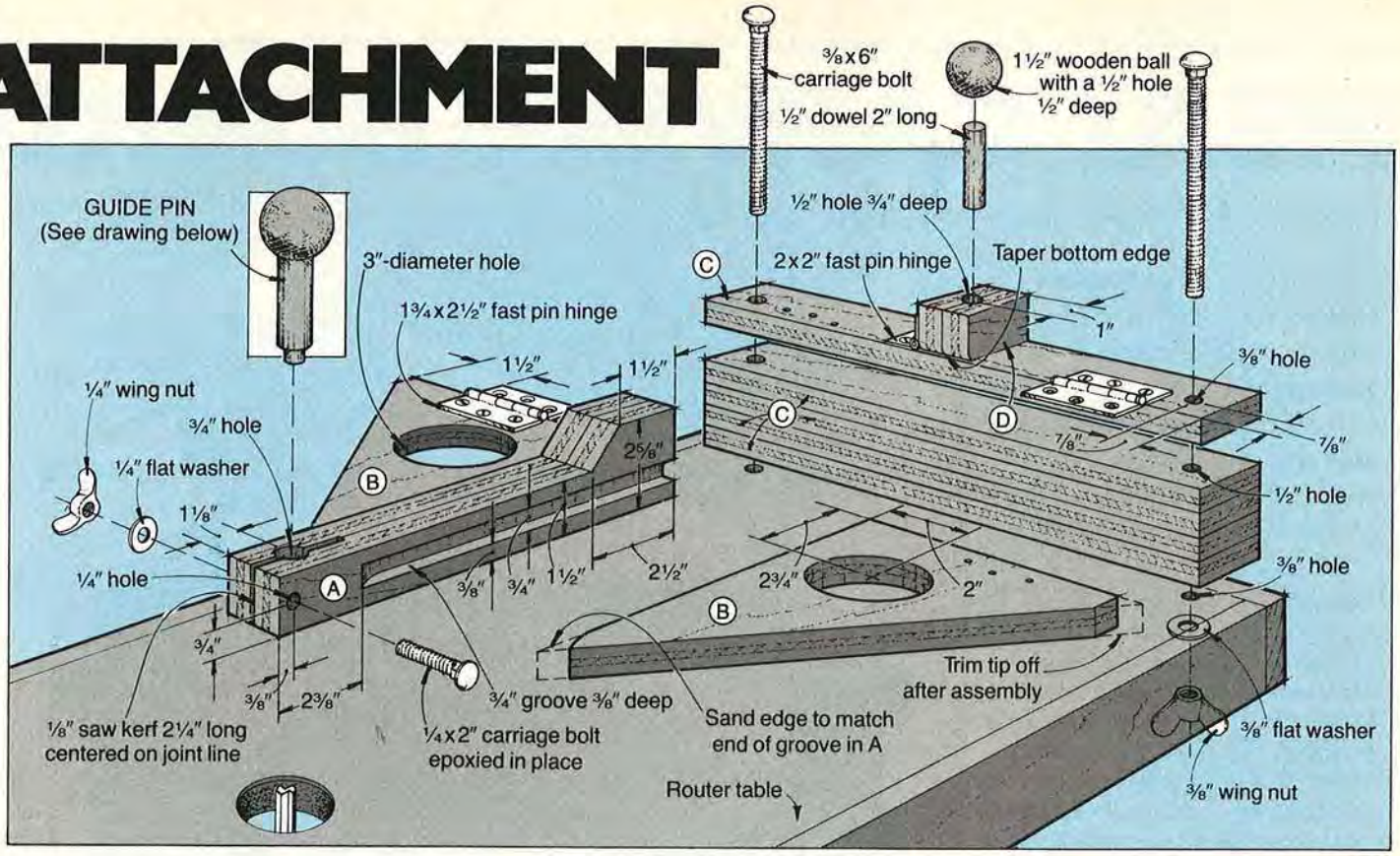
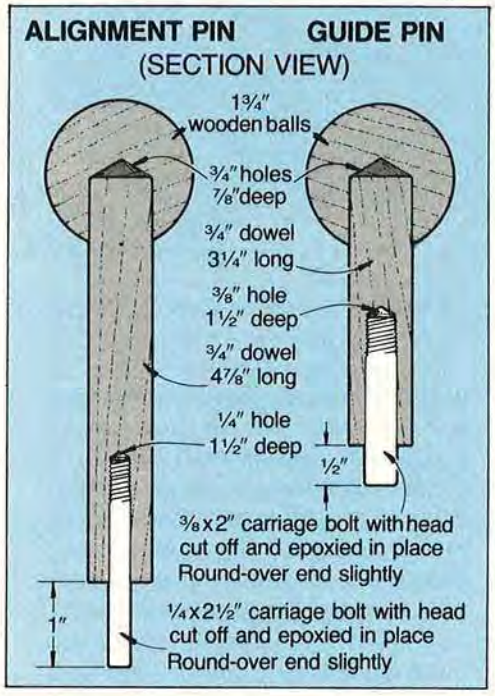
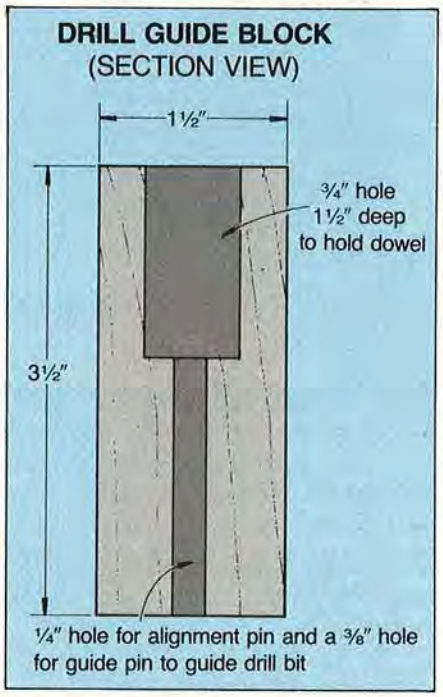
ATTACHMENT




ALIGNMENT PIN
GUIDE PIN
(SECTION VIEW)
1¾" wooden balls
¾" holes ⅞" deep
¾" dowel 3¼" long
⅜" hole 1½" deep
¾" dowel 4⅞" long
¼" hole 1½" deep
½"
⅜x2" carriage bolt with head cut off and epoxied in place Round-over end slightly
1"
¼x2½" carriage bolt with head cut off and epoxied in place Round-over end slightly


DRILL GUIDE BLOCK
(SECTION VIEW)
1½"
¾" hole 1½" deep to hold dowel
3½"
¼" hole for alignment pin and a ⅜" hole for guide pin to guide drill bit

Bill of Materials					
Part	Finished Size*			Material	Qty.
	T	W	L		
A*	1½"	2⅝"	11¼"	birch (laminated)	1
B*	¾"	6⅝"	8⅞"	birch	2
C	¾"	2"	14"	birch	5
D*	1½"	1½"	2"	birch (laminated)	1

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: two ⅜x6" carriage bolts with flat washers and wing nuts, ¼x2" carriage bolt with flat washer and wing nut, ¼x2½" carriage bolt for the alignment pin, ⅜x2" carriage bolt for guide pin, two 1¾x2½" fast pin hinges with mounting screws, one 2x2" fast pin hinge with mounting screws, 1½" wooden ball, two 1¾" wooden balls, ½" dowel, ¾" dowel, epoxy, finish

Block Drawing for how to make one), drill a ¼" hole 1½" deep, centered in the end of the ¾" dowel.

2 Cut the head off a ¼x2½" carriage bolt. Epoxy the threaded end of the bolt into the hole in the dowel so 1" of the bolt protrudes. File a round-over on the protruding end of the bolt.

3 Clamp a 1¾" wooden ball in a hand screw, and bore a ¾" hole ⅞" deep into the ball. Glue the ball onto the end of the dowel.

4 To make the guide pin, repeat steps 1 through 3, using a ⅜x2" carriage bolt, a drill guide block with a ⅜" hole and the Guide-Pin Drawing above *left*.

YOU'RE ALMOST DONE — FINAL ASSEMBLY

1 Center the arm and wing assembly against the front edge of the top support. Clamp them together, drill hinge holes, and hinge the assembly to the top support. (To ensure a snug fit between the wing assembly and top support, drill the

Continued on page 81

Stylized

Print this article

MEAT CARVING BOARD

MAKE SEVERAL IN A HURRY WITH OUR PIN ROUTING ATTACHMENT

Carve your next holiday turkey or roast in style on this unique carving board. The maple lamination will withstand years of hard use, and the routed juice groove will catch those messy but oh-so-tasty drippings.

Note: *Unless you own a pin router, you'll need to build the Delta-Wing Pin Routing Attachment described on page 38 to rout the pattern in the carving board. For more information about how to use the pin routing attachment and how to make the templates, see the article* Template Routing *starting on page 32.*

FIRST MAKE THE MAPLE LAMINATION

1 Cut 16 pieces of ¾" maple to 1⅜" wide by 19" long.

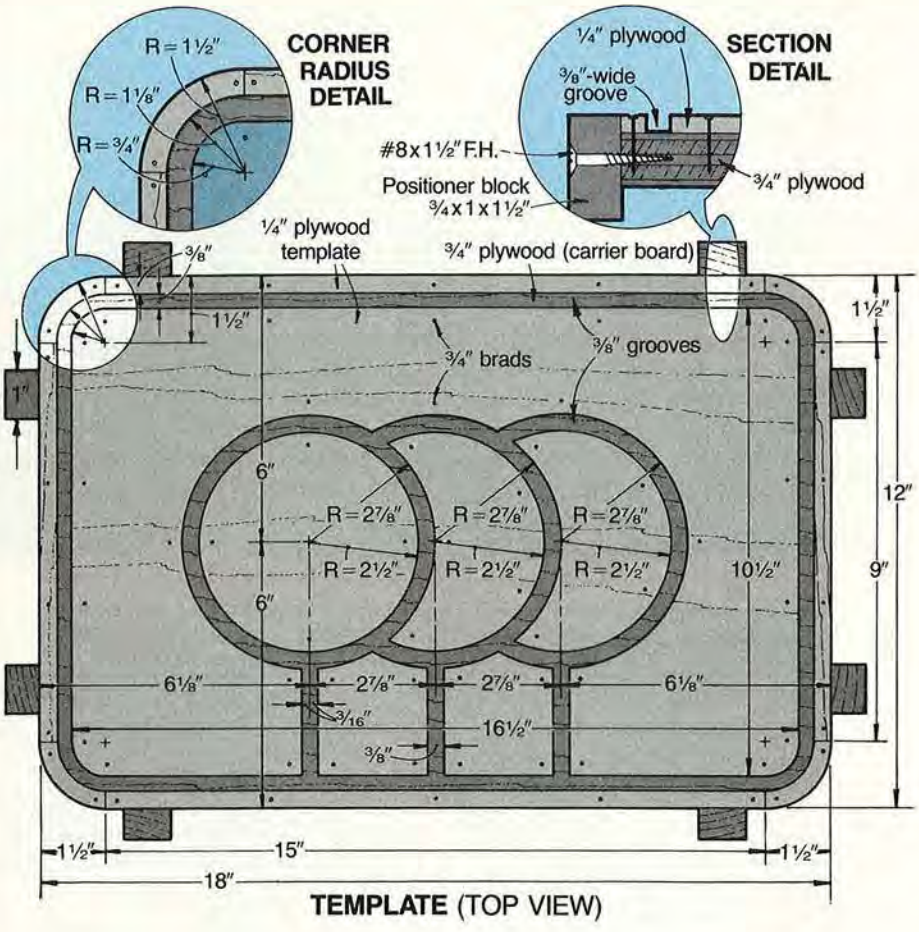
2 Glue and clamp the pieces together *face to face,* keeping the edges flush. (We clamped scrap stock across the pieces to keep them flat.)

3 Plane or belt-sand the top and bottom surfaces, being careful to keep the board flat. (We continually checked the surface for depressions with a straightedge.) The extra thickness allows up to ⅛" for scraping and sanding.

4 Cut the maple lamination to finished size (12 × 18"). (Our original maple stock was a fraction over ¾" thick, so we had to trim the lamination to a 12" width. If your lamination measures wider than 12", trim equal amounts off both sides instead of taking it all off one edge.)

5 Lay out a 1½" radius at each corner, then with a band saw, cut the corners to shape. Sand the four rounded corners smooth.

6 Using the Handle Detail on the opposite page as a guide, rout a ¾" cove ⅝" deep 5¼" long centered along each end of the lamination.



TEMPLATE (TOP VIEW)

THE TEMPLATE COMES NEXT

1 Cut a piece of ¼" plywood for the template and a piece of ¾" plywood for the carrier board to 12 × 18".

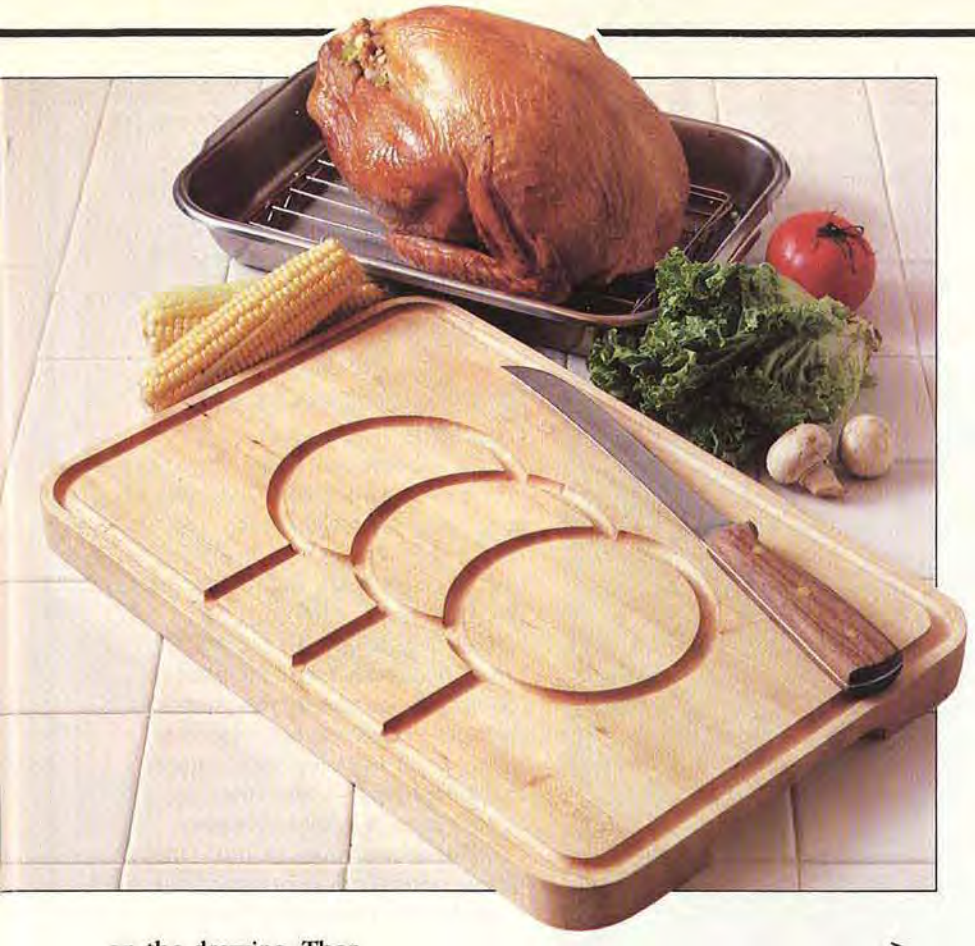
Note: *Take your time when laying out the pattern, cutting and sanding the pieces, and nailing them to the carrier board. The quality of the routed pattern depends on the careful preparation of the template pieces.*

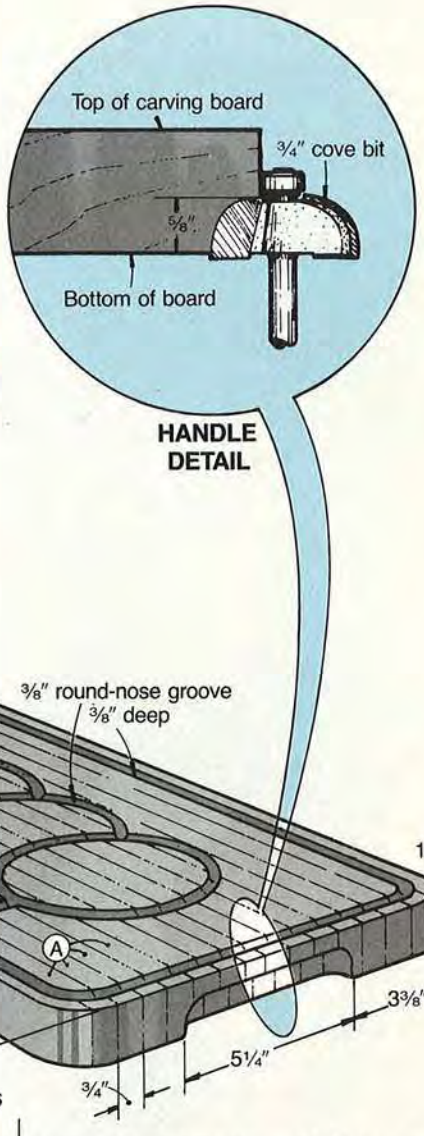
2 Transfer the template to the ¼" plywood, using the dimensions on the Template Drawing as a guide.

3 Cut the template pieces (except the straight ⅜"-wide strips forming the outer border) to shape using a scroll saw or a band saw. From ¼" plywood, cut the border strips to size on a table saw, so the grain runs lengthwise on each strip.

4 Sand all template pieces to finished shape. Now, glue and nail the pieces to the ¾" plywood carrier board to form the template, carefully keeping the grooves at least ⅜" wide. (We used the ⅜" guide pin from the pin routing attachment as a spacer to maintain the ⅜" gap between the pieces.)

5 Rip a long piece of ¾" scrap to a 1" width, and then crosscut it to 20" long. Now, cut eight pieces 1½" long from the length for the positioner blocks. Drill shank and pilot holes and mount two blocks to each edge of the carrier board with wood screws where shown





on the drawing. Then, secure the carrier board to the maple lamination with double-faced tape. The blocks and tape help hold the lamination firmly against the carrier board when routing.

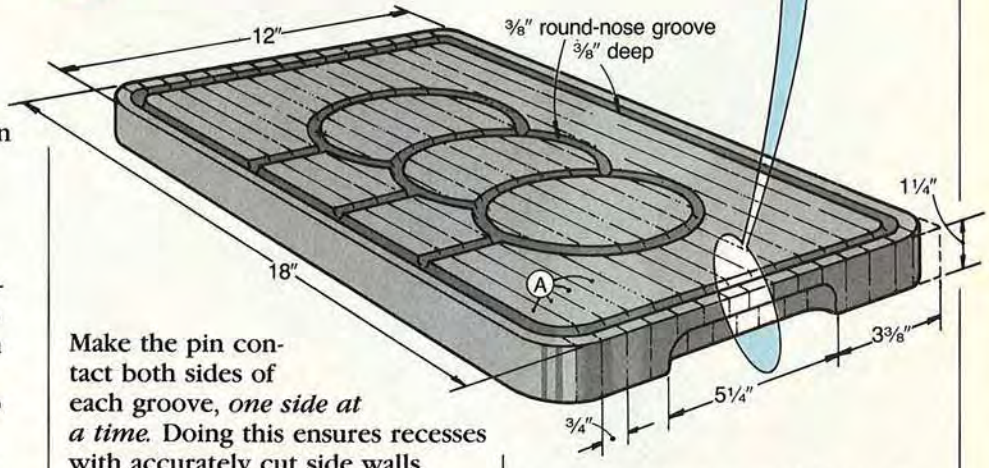
READY, SET, ROUT

1 Prepare the pin routing attachment for routing as explained on page 37 under the head "The Pin Router Method".

2 Chuck a ⅜" core box bit (also called a round nose) to your table-mounted router so the top of the bit extends ⅜" above the router table.

3 With the router off, position the lamination/template assembly with the ⅜" guide pin *in* one of the grooves in the template, ⅛" above the top of the router bit.

4 Firmly holding the lamination with one hand, start the router, lower the lamination onto the spinning bit, and lock the pin router arm down with the hold-down. Now, slowly and steadily move the lamination so the guide pin follows the pattern.



Make the pin contact both sides of each groove, *one side at a time.* Doing this ensures recesses with accurately cut side walls.

5 When you've completed routing the pattern, turn off the router, wait for the bit to quit spinning, and then unlock the arm. After checking to see that the bit made all cuts to your satisfaction, separate the work from the carrier board. Finally, finish-sand the carving board, including the juice groove. Apply a non-toxic finish.

BUYING GUIDE

- ***Cloth-backed double-faced tape.*** Catalog no. DF100, 70 feet, $7.95 plus $1 shipping and handling. Craft Supplies, 1644 South State St., Provo, UT 84601, or call 801/373-0917.

- ***Salad bowl finish.*** Non-toxic when dry. One pint, catalog no. B603-00015, $5.74. One quart, catalog no. B603-00016, $9.32. Add $2 for shipping and handling. Wood Finishing Supply Co., 1267 Mary Drive, Macedon, NY 14502, or call 315/986-4517.

Design: James R. Downing
Photograph: Bob Calmer
Illustrations: Kim Downing; Bill Zaun

RADIAL ARM SAWS

AMAZING CUTTING VERSATILITY WITHIN ARM'S REACH

Print this article

If you can figure the angle, a radial arm saw most likely can cut it. And with the many attachments available, this versatile cutting machine becomes a mini-workshop. For this report, we checked out nine popular home-shop models.

THESE SAWS DO IT ALL (ALMOST)

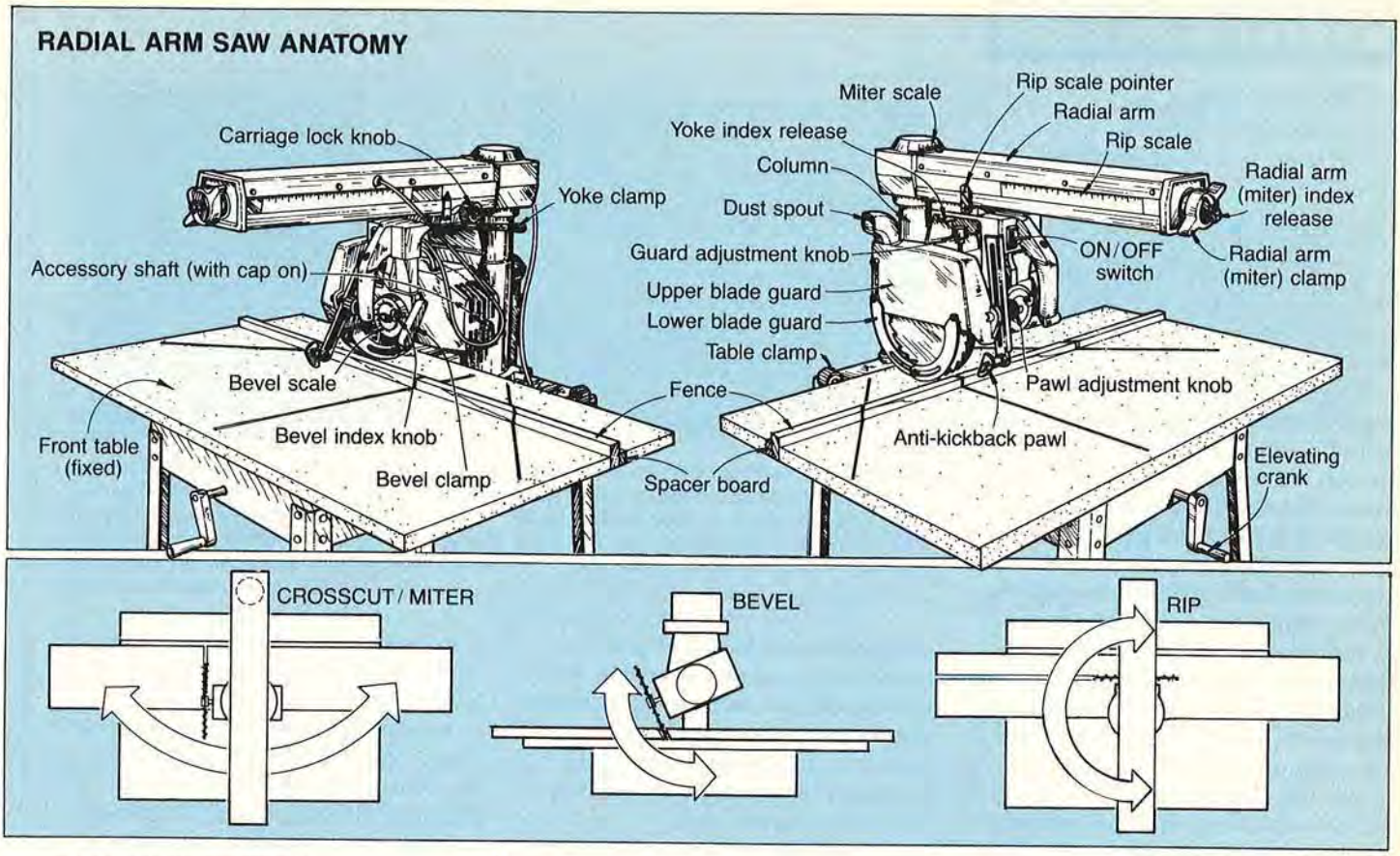
When it comes to sheer versatility, you can't beat a radial arm saw. In fact, some woodworkers contend that if they could have only one saw in their shop, this would be it. Here's why:

This saw makes all the basic cuts: square crosscuts, angled (miter) crosscuts, bevel cuts, and rip cuts — and combinations of these, such as compound miters and bevel rips — and does so, quite easily. A radial saw also makes precise rabbets and dadoes, either with a conventional blade or with a dado head. And, by setting the blade in a horizontal position (parallel with the saw table) you can perform a variety of edge- and end-cutting operations.

But that's not all! You'll find numerous accessories for attaching to the motor arbor or accessory shaft. With them, you can rout, mold, shape, joint, disk-, belt-, and drum-sand, do horizontal boring, buffing; even polishing. Several saws, including the Inca 810, have an accessory for attaching a router to the arm for overarm routing.

The chart on page 47 lists accessories offered by the saw manufacturers. Other tool manufacturers also make aftermarket accessories and safety devices for most common radial arm saws.

You'll also find a wide variety of blades available for radial saws. These include ultra-smooth-cutting carbide blades and several types of dado heads. In fact, about every kind of blade you can put in a table saw has its counterpart for a radial saw.



HOW THEY DO IT

The radial saw's unique design allows you to position the saw blade at any angle and in any position above the work table (within reach of the saw's arm). Here's how:

The *motor* and *blade assembly* pivots in a *yoke*. The yoke, in turn, pivots on a *roller carriage*, which rides on tracks along the *radial* arm. The arm itself pivots on a *column*, allowing you to make left- and right-hand miter cuts. Note these basic saw movements in the illustrations *above*.

You raise or lower the arm to adjust the height of the saw blade above the table. To change blade position, set one or more of the saw's controls. To crosscut, pull the blade along the arm, through the stock. To rip, set the blade at the required distance parallel to the fence, lock it in position, then push the stock through it.

There's one exception: the Inca 810. This saw has a number of unique operating features that sets it apart, so we discuss it separately on page 46.

HOW WELL THEY DO IT

Most users agree that radial saws perform best as cutoff saws — making crosscuts. The stock remains fixed while you're cutting. That makes it easier to control long pieces while crosscutting than it would be on a table saw. And you can't beat radial saws for making fast, precise repetitive crosscuts — especially difficult ones like compound miters.

Although you can use a radial saw for making rip cuts, we find this easier to do on a table saw. For one reason, a radial saw cuts upward through the stock. This tends to lift the stock off the table. When ripping, you have to set the upper blade guard and anti-kickback pawl to help prevent lifting. But even so, the upward cutting action sometimes causes radial saws to kick back — throw the stock back at you — if the blade binds in the cut.

You'll also find it harder to make narrow rips, especially in short pieces. You just can't control the stock as safely as you can on a table saw.

Although numerous attachments are available, you may find them less convenient to use than single-purpose tools designed for these operations. If you already own these tools, you'll be less likely to use a radial saw for such operations. Even so, it can save you lots of time in cutoff work alone, and it does make accurate rip cuts.

To achieve such versatility, a radial saw has numerous moving parts, controls, and adjustments. Stresses placed on these moving parts and controls during normal operation can eventually take a saw out of alignment.

Because of this, some woodworkers consider radial saws inaccurate cutting machines. But the saws have adjustments to maintain cutting accuracy.

The more frequently you use the saw and the more accurate you want the work to be, the more attention you'll have to give to these adjustments. If you want a good idea of what's involved, check the owner's manuals for the saws you're looking at.

Continued

RADIAL ARM SAWS

HOW SAFE ARE RADIAL SAWS?

If you don't become completely familiar with the way a radial saw cuts, it can be dangerous. Here's why: When crosscutting, the blade rotates clockwise, pushing the stock down and back against the fence as you pull the motor/blade assembly toward you.

This cutting action, called *climb cutting*, can force the blade toward you if it binds and grabs the wood, or you try to cut too fast. In some cases, the blade may actually walk up and over the wood. Usually the motor will stall before the saw does this. But accidents can occur when the saw carriage unexpectedly jumps forward or pushes against the operator's sawing arm. This may twist his body, forcing his left hand (holding the stock) into the path of the blade.

For this and other safety reasons, radial saws come equipped with upper and lower blade guards (lower blade guard optional on Sears saws). Unfortunately, all of the saws we looked at, except the Inca 810 and Ryobi RA-200, have, in our opinion, poorly designed blade guards. The thin, leaf-type guards can get caught in saw kerfs cut in the fence. Still, the saws are safer with the guard on.

As mentioned earlier, when ripping, the blade cuts upward through the stock. This tends to lift the stock off the table and may kick it back toward the saw operator. The more powerful the saw, the greater the potential for kickback. On an underpowered saw, if the blade binds in the wood, the motor may stall, stopping the blade.

To help prevent kickback, radial arm saws come equipped with *anti-kickback pawls* (see photo *above*). The anti-kickback pawl digs into the wood when it starts to kick back. A splitter guide located behind the saw blade holds the saw kerf open to help keep the blade from binding in the cut. But to make these devices work correctly, you must adjust them for each cutting operation. Properly positioned, the upper blade guard also helps prevent the stock from lifting off the table, should the blade bind.

In addition to these standard features, we also recommend using hold-down devices, such as the Ripstrate or Shophelper. They help hold the work on the table and against the fence during rip operations. Also, when ordering cutting accessories for your saw, make sure the manufacturer provides a suitable guard for them, or instructions on how to make one.

Other safety features normally found on radial saws include blade brakes (automatic or manual) and keyed locking switches (see photo *above*). A few offer optional carriage-return mechanisms.

Unlike thin steel guards on most saws, plastic lower blade guard on Ryobi RA 200 doesn't catch in saw kerfs cut in the fence. Anti-kickback pawl (in front of blade) helps prevent kickback.

Keyed switch lock on 10″ DeWalt 7749 prevents unauthorized use of saw. Delta, Ryobi, and Sears also offer this feature. Large, slap-type OFF switch allows you to turn off the saw quickly in an emergency.

HOW MUCH WILL THESE SAWS HANDLE?

Manufacturers "size" radial saws by the largest diameter blade they will accommodate: a 10″ saw (the most popular size for home shops) handles blades up to 10″ in diameter. The saw's maximum cutting depth — the distance between the bottom of the blade and the motor housing — increases with blade size. However, not all saws of the same nominal size have the same cutting depth, as indicated in the chart on page 47.

Generally, 10″ saws will cut stock up to about 3″ thick; 12″ saws, up to 4″ thick. But you'll pay at least twice as much to get the extra inch of capacity offered by a 12″ saw, such as the DeWalt 7790 and Delta 33-890. We included these two saws in our review, along with the Sears 19861N for those of you interested in a 12″ saw. Also note that the 8-¼″ Ryobi RA-200 has about the same cutting depth as most 10″ saws (3″).

The length of the arm and the distance the saw can travel on it determine the width of crosscuts and miter cuts it can make. As the miter angle increases, cutting width decreases. With the blade offset to the left side of the arm, a radial saw has less capacity on left-hand miters than on right-hand ones, unless you can set the fence closer to the rear of the table.

Arm length and saw travel also govern maximum rip capacity. If you plan on ripping 4′-wide panels, you'll need a saw with a maximum rip capacity of 24″.

The chart on page 47 shows the various cutting capacities of the saws we looked at. Note that the Inca 810 has an optional arm. It allows a maximum 28″ crosscut — widest of the saws we looked at.

CONTROLS: WHAT TO LOOK FOR

Radial arm saws have eight basic controls which allow you to set the saw blade exactly where you want it and keep it there: the elevating crank, radial arm clamp, radial arm index release, carriage lock knob, yoke clamp, yoke index release, bevel clamp, and bevel index knob. The drawing on page 43 shows the locations of these controls on a typical radial arm saw.

You'll find some of the controls in different locations on different saws. So if you expect to change blade positions frequently, look for "up-front" controls. Both Delta saws, for example, have convenient control positions, as well as solid, positive locking and clamping mechanisms.

We found column-mounted elevating crank and arm controls on the 12″ DeWalt 7790 hard to reach from the operator's position. But we like their solid, positive operation. Because such controls have fewer moving parts, they're less likely to need frequent adjustment to maintain accuracy.

The DeWalt 7790 and Black & Decker 1712 have column-mounted arm controls and elevating crank (photo *above*). These controls are less handy to operate, but have fewer moving parts, so they're generally easier to maintain and require less-frequent adjustment. We found the controls on the Sears easy to use, especially the up-front quick-release latches to change fence positions (most saws use screw clamps at the rear of the table). Its under-table elevation crank also operated easily and with very little play. Cranks in this location can be sloppy because they're connected to the column by a long rod.

KEEPING THE SAW ON TRACK

Look for solid arm construction and a smooth-gliding carriage. You'll find arms made of cast iron, cast aluminum, or heavy-gauge formed steel. Cast iron has the greatest rigidity and durability.

The two DeWalt saws and the 10″ Delta 33-990 have four ball-bearing carriage rollers that ride on internal channels milled into a heavy cast-iron arm. With this sturdy design, you're not likely to damage the tracks accidentally.

The 12″ Delta 33-890 has concave roller bearings that ride on replaceable steel track rods recessed into a cast-iron turret arm. When the carriage becomes loose in the track due to wear, you can simply rotate the rods to expose a smooth, unused surface.

On both Ryobi saws, the carriage roller bearings ride on tracks formed into a heavy-gauge stamped-steel arm. Because steel dents easily, the tracks are more prone to damage than cast iron ones.

The Sears saw has an unusual design: the carriage glides on nylon blocks in a formed steel track attached to a cast-aluminum arm. Roller bearings push the carriage downward against the track. Like the Ryobi saws, the steel tracks are prone to damage, but they're replaceable.

THE DELTA TURRET ARM

The unique "turret arm" design of the 12″ Delta 33-890 (and larger Delta saws) allows the arm to rotate 360° above the work table. This provides full table capacity for left- and right-hand miters. (On most single-arm saws, the blade leaves the table on left-hand miters). It also allows miter cuts at angles greater than 45°.

MOTOR — HEART OF THE SAW

All radial saws use standard induction motors, except the two Ryobi models. They use brush-type universal motors. Although we're still skeptical of the life expectancy of these small, high-speed motors on stationary tools, the one on the RA-200 has an advantage. Its small size gives this 8-¼″ saw a 3″ cutting depth — about the same as most 10″ saws.

On most other radial saws, the blade runs directly off the motor arbor at 3450 rpm. The Ryobi saws, with high-speed motors, have a built-in gearbox to reduce motor speed to an acceptable blade speed (4,500 rpm on the RA-2500; 5,000 rpm on the RA-200). The accessory shaft runs at motor speed (17,600 rpm on the RA-2500; 18,500 rpm on the RA-200) rpm so you can attach router and shaper bits directly to the shaft.

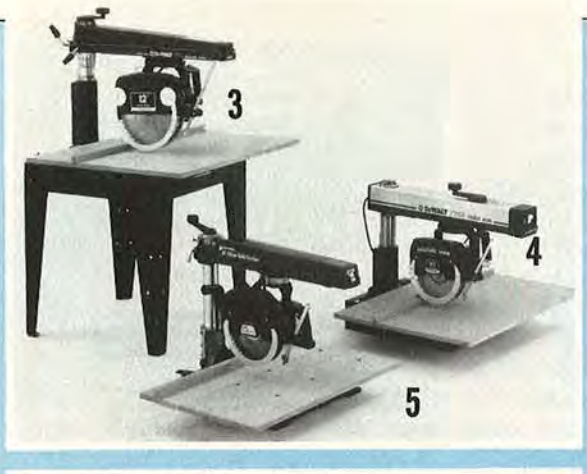
Some radial saws use totally enclosed, fan-cooled (TEFC) motors; others use open, drip-proof motors (see chart on page 47). In a shop environment, sawdust will find it's way into open motors, which will shorten their life.

Continued

RADIAL ARM SAWS

WHY WE CHOSE THESE SAWS

The saws shown here represent most of the consumer-type radial saws readily available to the home woodworker. (In addition to their electronic model, Sears offers 10″ and 12″ saws, which we included in the chart on the facing page). Delta, DeWalt, and several other manufacturers offer larger, industrial-type saws up to 20″, but these are in an entirely different price range.



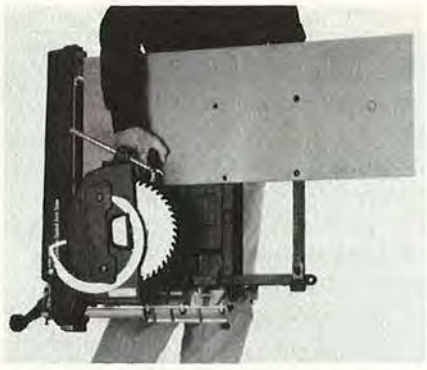
THE SAWS

1. 10″ Ryobi Model No. RA-2500
2. 8 ¼″ Ryobi Model No. RA-200
3. 12″ DeWalt Model No. 7790
4. 10″ DeWalt Model No. 7749
5. 10″ Black & Decker Model No. 1712
6. 12″ Delta Model No. 33-890
7. 10″ Delta Model No. 33-990
8. 10″ Sears Model No. 19861N
9. 9″ Inca Model No. 810

TWO NEW PORTABLES

If you don't have shop space for a full-size radial saw, check out one of the compact benchtop models. The cast aluminum arm, column base, yoke, and motor housing on the 10″ Black & Decker 1712 contribute to its light 65 pounds. Though you can't expect it to be as rugged as the big boys, it has exceptional rigidity and cutting performance for its size and weight. The fold-up feature, shown at *right*, allows you to store it in a small space or easily haul it around with you.

The 8¼″ Ryobi RA-200 won't fold flat like the Black & Decker, but you can easily carry this 53-pounder around the house and yard for on-site work. We also found this saw a good performer for its size.



Black & Decker folding saw: a compact, walk-away winner.

INCA 810: A UNIQUE SAW, INDEED

This Inca not only looks different: it works differently, too. First, it cuts on the *push stroke*, not the pull stroke as other radial saws do.

Second, to make miter cuts, you rotate the table, not the arm. This enables you to make wider miter cuts than on most other saws. But it also means the saw needs clearance on all sides when miter-cutting long boards, so you can't put it against a wall.

Third, the Inca's fixed-yoke design requires physically rotating the radial arm to make bevel cuts. The photo *above* shows the saw set up for a compound miter. We

RADIAL ARM SAW BUYMANSHIP

MANUFACTURER	MODEL NUMBER	CUTTING CAPACITY: BLADE SIZE (DIAMETER, INCHES)	CUTTING CAPACITY: DEPTH OF CUT (INCHES AT 0°)	CUTTING CAPACITY: DEPTH OF CUT (INCHES AT 45°)	CUTTING CAPACITY: MAXIMUM CROSSCUT (INCHES)	CUTTING CAPACITY: MAXIMUM RIP (INCHES)	INDEX STOPS: MITER	INDEX STOPS: BEVEL	MOTOR: TYPE[1]	MOTOR: HORSEPOWER[2]	MOTOR: VOLTS	MOTOR: AMPS	MOTOR: NO-LOAD BLADE SPEED (RPM)	MOTOR: ACCESSORY SPINDLE (Y, N)	MOTOR: ARM	MATER[3]: COLUMN BASE	SIZE[4] W x D x H (INCHES)	TABLE W x D (INCHES)	WEIGHT (LBS)	SUGGESTED PRICE[5]
Black & Decker	1712	10	2 13/16	2	13 3/8	19 7/8	0°,45°L&R	0°,45°,90°	TEFC	2*	120	11	3,450	N	CA	CA	34x26 1/2x24*	34x21	65	$384
Delta	33-890	12	4	2 1/2	14 3/8	24 1/4	0°,45°L&R	0°,45°,90°	TEFC	1 1/2	115/230	11/5.5	3,450	N	CI	CI	30x32x63 1/2	25 1/2x30	300	$1,422
Delta	33-990	10	3	2 1/4	12 3/4	24	0°,45°L&R	0°,45°,90°	TEFC	1 1/2	115/230	11/5.5	3,450	Y	CI	CI	42x37x53 1/2	42x24 3/4	178	$630
De Walt[6]	7790	12	4	2 3/4	16	27	0°,45°L&R	0°,45°,90°	TEFC	3 1/2*	120/240	17/8.5	3,450	N	CI	CI	38 1/2x34x53 1/2	38 1/2x29		$1,045
De Walt	7749	10	3	2 1/8	14 1/2	24 1/16	0°,45°L&R	0°,45°,90°	ODP	2 1/2*	120/240	12.5x6.25	3,450	Y	CI	CI	36 1/8x31 1/2x24*	36 1/8x24 5/8	129	$621
Inca	810	9	2	1	16	25	0°,45°L&R	NA	ODP	1.3	110	9	3,500	N	FS	FS	29x34 3/4x25 7/8*	23 3/8x32	69	$595
Ryobi	RA-2500	10	3	2 1/4	14 1/2	24 1/2	0°,45°L&R	0°,45°,90°	ODP	2 1/4*	115	11	4,400	Y	FS	FS	40x38x55 1/2	40x25	106	$616
Ryobi	RA-200	8 1/4	2 1/8	1 5/16	10 5/16	19 7/8	0°,22 1/2°L22 1/2°,45°R	0°,45°,90°	ODP	2*	115	11	5,000	Y	FS	CA	27 1/2x32x20 1/4*	27 1/2x21 3/8	53	$445
Sears	1989N	12	4	2 1/16	16	26	0°,45°L&R	0°,45°,90°	ODP	2*	240	7	3,450	Y	CA	CA	44x32x28*	44x27 1/2	171	$649.99
Sears[7]	19861N	10	3	2 1/4	15 1/2	26	0°,45°L&R	0°,45°,90°	TEFC	1 1/2	120/240	11/5.5	3,450	Y	CA	CI	44x36x57	44x27	278	$469.99

1. (TEFC) Totally enclosed, fan-cooled; (ODP) Open, drip-proof
2. Continuous horsepower (*) indicates maximum developed horsepower.
3. (CI) Cast iron; (CA) Cast aluminum; (FS) Formed steel
4. Height includes stand, (*) indicates height without stand
5. Most saws often discounted 10-30% below manufacturer's suggested list price.
6. Sears offers similar saw. De Walt is a division of Black & Decker.
7. Available with one-, two-, or six-drawer cabinet (shown on facing page). Sears also offers same basic saw without electronic readout.

MANUFACTURER'S ADDRESSES & ACCESSORIES

This list includes most of the optional accessories offered by saw manufacturers. For additional details, write to the following addresses for catalogs.

Black & Decker/DeWalt 626 Hanover Pike, Hampstead, MD 21074.
Accessories: Automatic carriage return, blades, dado head, disk and drum sanders, planer head, roller head stop, router attachment, saber saw attachmet, shaper head set and fence, stand, tool guard (shaping, jointing, disc sanding, planing).

Delta International Machinery Corp. 246 Alpha Drive, Pittsburgh, PA 15238.
Accessories: Automatic carriage return (33-890 only) blades, dado head, disk and drum sanders, molding cutterhead and knives, molder/shaper guard, shaper bit adapter, stand, stand caster set.

Inca: Garrett Wade 161 Ave. of the Americas, New York, NY 10013.
Accessories: 9" carbide blades, extension arm (increases crosscut capacity to 28") router carriage (fits Porter-Cable routers), stand.

Ryobi America Corp. 1158 Tower Lane, Bensenville, IL 60106.
Accessories: Blades, dado head, disk and drum sanders, molding cutterhead and knives, router bit adapter and bits, shaper bit adapter and bits, shaping table, stand.

Sears, Roebuck & Co. (contact local store for latest tool catalog)
Accessories: Automatic carriage return, belt sander, blades, dado head, depth gauge, disk and drum sanders, drill chuck, hold-down clamps, molding cutterhead and knives, molding/dado head guard, surface planer attachment, router attachment, stand, more.

found it inconvenient having to loosen and retighten the four hex-head bolts attaching the arm to the column to set the bevel.

Fourth, to set up for rip cuts, you must remove the blade/motor assembly from the arm to reposition it parallel to the fence. The two large black knobs (see photo) lock the carriage to the arm.

If you expect to change blade settings frequently, you may find the Inca more of a hassle to operate than conventional saws. However, its simplistic, rugged design makes it easy to adjust for accurate cutting. But test it out for yourself — just for the fun of it.

SEARS' LCD READOUT: GIMMICK OR GLIMPSE OF FUTURE?

Unlike their first electronic radial saw, Sears does not use electronically controlled motors to operate the saw positions on their new line. The digital electronics simply read out the manually set controls.

Sears electronic LCD readout: four super-accurate measurements.

Nonetheless, we found the LCD readouts to be accurate, easy to calibrate, and easy to read. Miter and bevel measurements read out in ½° increments; elevation and rip measurements in hundredths of an inch. In this case, we prefer the digital device to the printed or engraved scales on most stationary tools, which we often find hard to read and set accurately.

Produced by Jim Barrett
Technical Consultant: George Granseth
Photography: Bob Calmer
Illustrations: Kim Downing; Bill Zann

Print this article

Going All Out For DUST CONTROL

How One Minnesota Woodworker Designed His Own Central Collection System

Tired of shifting your shop vac or portable dust collector from one tool to another? Maybe it's time you thought about a central dust collection system. As this craftsman discovered, an efficient system doesn't have to cost you a bundle of money. And, using the guidelines in this article, you can do all the work yourself.

It won't take you long to tick off all the reasons for controlling wood dust and chips in your home shop — convenience, health, safety. In fact, and as Bryan Lamont, a Coon Rapids, Minnesota, woodworker will attest, they sometimes come to you in a flash!

Fifteen years ago, when Bryan was a high-schooler, he was sanding a project in his dad's home basement shop. Suddenly, there was a sound like a sonic boom and the furnace in the next room belched fire! "It really scared the liver out of me at the time," he recalls. "But that incident made me keenly aware of one of the problems with wood dust."

That scare didn't erase Bryan's woodworking interest, though. He went on to study it in technical school and became a cabinetmaker. Now, he sells industrial pollution control equipment and machinery for G.C. Peterson Co. and pursues woodworking off-hours in his home basement workshop that he's outfitted with a central dust collection system.

Bryan's setup uses a 2-hp. collector to whisk away debris from a full complement of tools through a 4" duct system. He uses both rigid and flexible pipe for the ducts in his 23x13' shop. The system (less the collector) cost about $300.

How do you know if you're ready to go all out with a central dust collection system? "I think it boils down to how many tools you have," suggests Bryan. "If you only have one or two major woodworking machines, the advantages of a central system might be questionable. But with three or more major power tools, there's no question you'll enjoy a system for the convenience alone."

DESIGN TIPS FOR A CENTRAL SYSTEM

When Bryan decided to put in a central system, he discovered that there's plenty of help available if you want to do it yourself. A lot of engineering research has been done on the installation of large commercial systems, and these same principles apply to the home shop — but scaled down. Besides talking to a number of dealers and pros who do commercial installations, Bryan relied heavily on the data in a guide available from Delta International (see where to write at the end of this article). Here's what he found out:

- *Duct diameter influences air flow velocity.* Usually, 4"- or 5"-diameter duct pipe will do the job in a home shop. Use too small a diameter and you risk clogging; too large and airflow velocity over a long run may actually drop below 3,500 feet per minute (FPM), a point where dust actually settles out.
- *Minimize resistance with smooth duct material.* You'll have less resistance and air turbulence in a smooth-wall, round-pipe duct. Reinforced steel ducting fills the bill. It won't collapse, doesn't have to be grounded as does PVC drainpipe, and only costs about $1.20 per foot. In ribbed hose or corrugated material, friction can reduce air velocity by 50 percent.
- *Use gradual curves to change airflow direction.* Sharp bends in a duct system cause air and debris to hit the duct wall, bounce back, and produce turbulent resistance. This resistance can be 100 percent higher in a 90° T-fitting than in a gently curved, 90° elbow.
- *Avoid connecting small-diameter duct to large-diameter duct.* A small duct *diffuses* the volume of air entering the larger duct and causes clogging.
- *Use hoods or flanges at inlets to the system.* Attach all hoods directly to tool stands or cabinets. Unattached hoods or duct pipe should have at least a 2"-wide flange on all sides to prevent interfering airflow into the system from behind the inlet.
- *Shut off airflow at unused tools.* Place plugs or slide gates at the inlets of unused tools so you can shut them off from the system. Then, you'll have full air-flow at the tool you're using.

HOW BRYAN PLANNED HIS SYSTEM

With the above design tips in mind, Bryan began planning his system. He found that with a central dust collection system, you have to balance a number of variables:

- Length of proposed duct run from the tools to the collector
- The specific cubic feet per minute (CFM) pulling power needed at each stationary tool
- Diameter and type of ducting
- The CFM capability of the collector to be used.

Less the 2 hp. collector, shown in the far back corner, Bryan Lamont's central dust collection system cost him about $300.

Bryan followed these steps and you can, too:

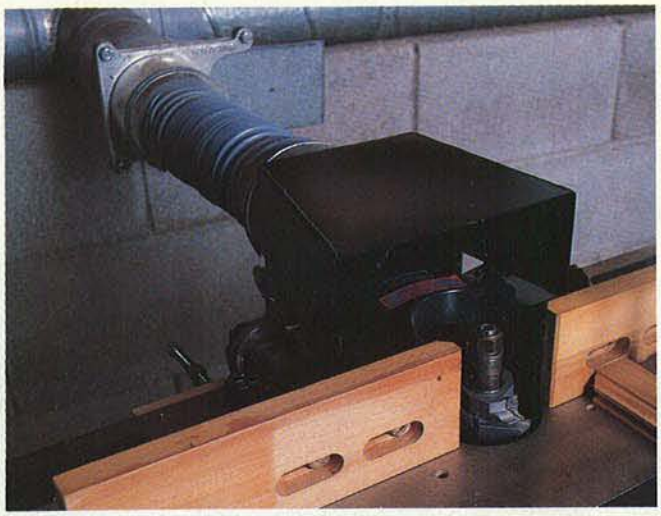
Step 1. *Plan the duct system on paper.* Show tool locations and where you want the dust collector (it doesn't have to be centrally located where it takes up work space). Starting at the collector, draw in the main duct. Then, add branches or sidelines to all the tools, including vertical drops, necessary curves, and angles.

Step 2. *Total the length of your main duct and its branches.* In figuring, consider straight length of ducting as well as *equivalent length* (see chart at *right*).

LENGTH VALUES FOR DUCTS AND FITTINGS

Duct or fitting	Equivalent length
Smooth wall pipe	Actual length
Corrugated pipe/hose	Actual length x 1.5
Duct inlet from tool cabinet/built-in hood	0′
Flanged hood inlet	0′
Unflanged hood inlet	10′
90° T-fitting or 90° hose bend	10′
45° curved elbow	5′
Side leg of 90° tee	20′
Side leg of 90° wye tee	5′
Straight-through tee leg	0′
Slide gate	0′
Five-foot ribbed hose	0′

Continued



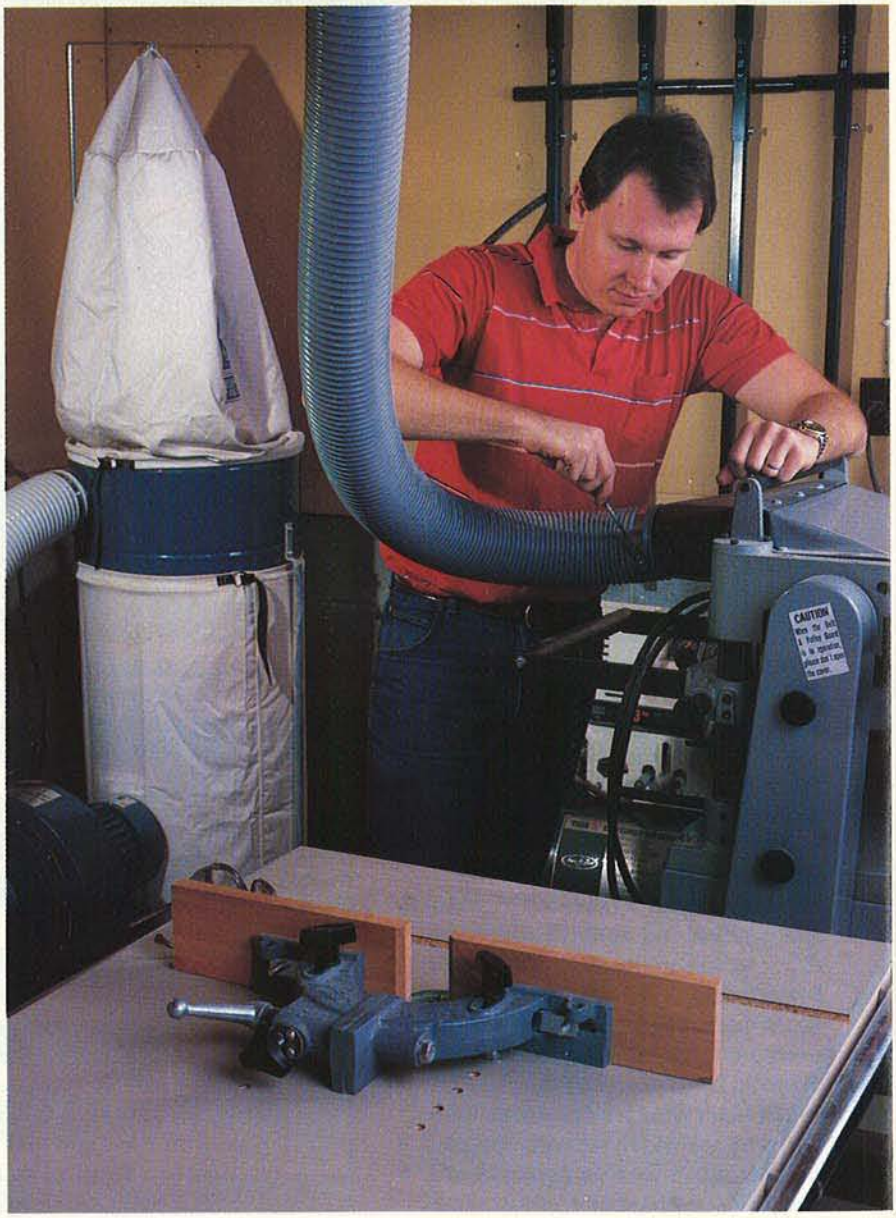
Photos, clockwise from above:
The 4" flexible hose connecting Bryan's table saw to the system doubles as a floor sweep. He uses it to collect odd debris missed by the system. It's flexibility allows him to reach nooks and crannies.

Hoods like this one on Bryan's shaper directs airflow into the duct for a clean sweep of wood dust and chips. The short connection doesn't lose much power to friction, and makes up for the uncurved tee.

Under the jointer, the hood serves as a collection box with the duct attached at bottom to gather the most chips. For a good fit, Bryan had to adapt the hood with a wooden reduction plate.

For his planer, Bryan installed a ceiling drop of flex hose. Being near the collector, the line has enough power to lift wood chips up, then over to the collector in the corner.

Metal slide gates allow Bryan to shut off ducts to unused tools for maximum CFM at the tool in use. Duct tape works to hold the connection together, but you can also use rivets or sheet metal screws.



Equivalent length means assigning each type of fitting that has more airflow resistance than straight duct, such as elbows, a value equal to a certain length of straight duct. Add up separately all the values for the fittings and straight runs from each of your tools on the system to the dust collector, then total. This ensures that you will arrive at the longest possible length in your system for the accurate calculation of available CFM at a tool.

Step 3. *Determine the CFM needs for each of your tools on the system.* From the list *below*, find the approximate CFM requirement for the power tools on your system (or refer to an owner's manual) and jot them down on your system sketch.

AIRFLOW REQUIRED AT POWER TOOLS

Power tool		CFM
Band saws up to 2" blade		450
Belt sanders	up to 6"	500
	up to 9"	750
Disk sanders	up to 12"	400
	up to 18"	650
Drum sanders		400
Jointers	up to 6"	400
	up to 12"	700
Thicknessers	up to 13"	700
Radial arm saws, 10"		400
Table saws, 10"		400
Shaper, ½" spindle		400

Now, with your notations from the chart, you'll know exactly how much airflow you'll need at each tool to remove dust and chips when all other inlets are closed. Use the *highest* of these CFM figures for your tools to find the correct duct diameter your system will require in the next step.

Step 4. *Find the duct diameter that will do the job.* Charts like the one *below*, available at equipment dealers, help determine the duct diameter that, when coupled with a specific dust collector, will provide your system with enough CFM at each tool.

Let's say, for instance, that you have a 2-hp. dust collector with a 5" outlet port, so you'd like to use 5" ducting. After totaling up the duct length in feet of your longest run (add lengths of straight duct and equivalent lengths of fittings), look on the left side of the chart and find the number that corresponds to your total. In this example, if your total was 91', you'd enter the chart just above 90 and read across to locate the curve for 5" duct. Now, follow the straight line down from that curve which leads to the approximate CFM you need to have at the tool on the end of the run.

A 10" table saw, in this instance, needs 400 CFM, and at 91' of 5" duct your system would generate 475 CFM — more than enough. You can also see that 91' of 4" duct wouldn't deliver the CFM you need for your table saw. But 5" duct will more than do the job for duct systems of 90' or less and CFM requirements up to about 700. You might want to check duct length from every one of your tools on the system individually against the chart, just to be sure you'll get enough CFM at every one of them.

What if you can't find a matchup with a certain diameter of duct and the correct CFM? You'll have to do some redesigning. You can shorten duct run by relocating tools, cut down on high-resistance fittings or materials, opt for a different diameter of duct, or go with a larger dust collector. Most home shops use either a 2- or 3-hp. collector to power a central system since most woodworking hobbyists only use one dust-making tool at a time.

Caution: *Airflow/duct length charts, such as our example, are specific to brands and models of collectors. They may or may not work for your present collector or any other collector. For accurate calculations, visit a dealer or write the manufacturer.*

AIR FLOW/DUCT LENGTH CHART TO MATCH SYSTEM TO COLLECTOR

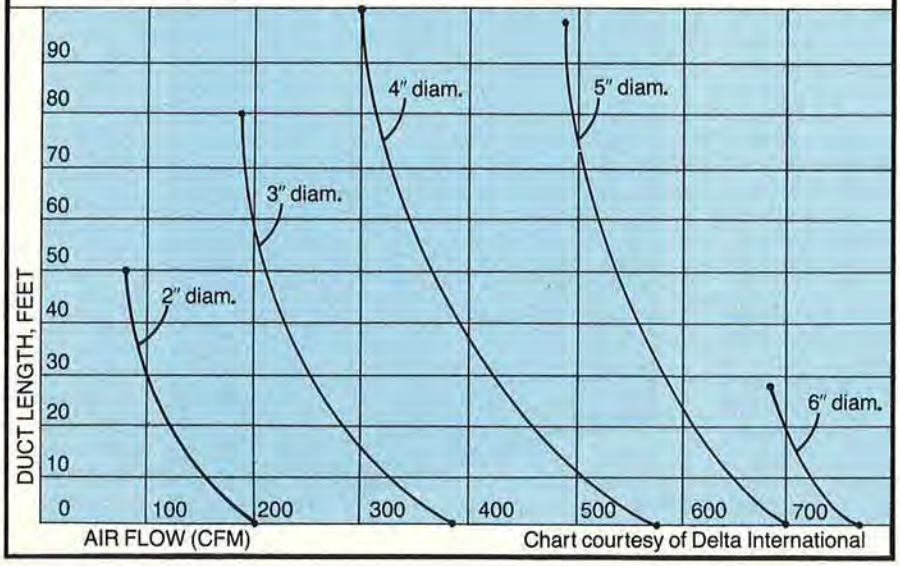


Chart courtesy of Delta International

For additional information on how to plan your system, send $2 for Delta's guide "Central Dust Collection Systems" to Eugene Sliga, Delta International, 246 Alpha Drive, Pittsburgh, PA 15238. For more information about dust collectors, read "Portable Dust Collectors", *WOOD* Magazine, April '87, page 54. And see a related article, "Make Your Own Hoods To Collect Dust", on page 87 of this issue.

Produced by Peter J. Stephano with Gene Schnaser
Photographs: Mitch Kezar

Print this article

ANOTHER GREAT SHOP ORGANIZER

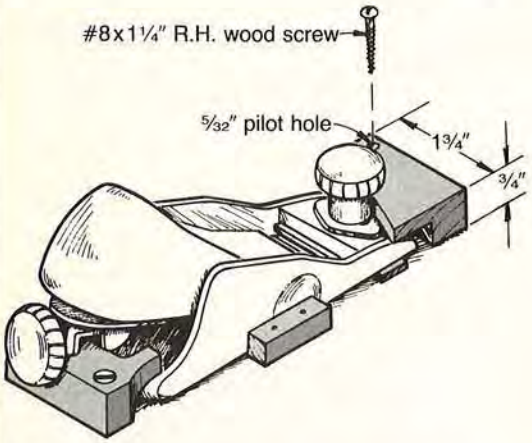
NOT-SO-PLAIN **PLANE RACK**

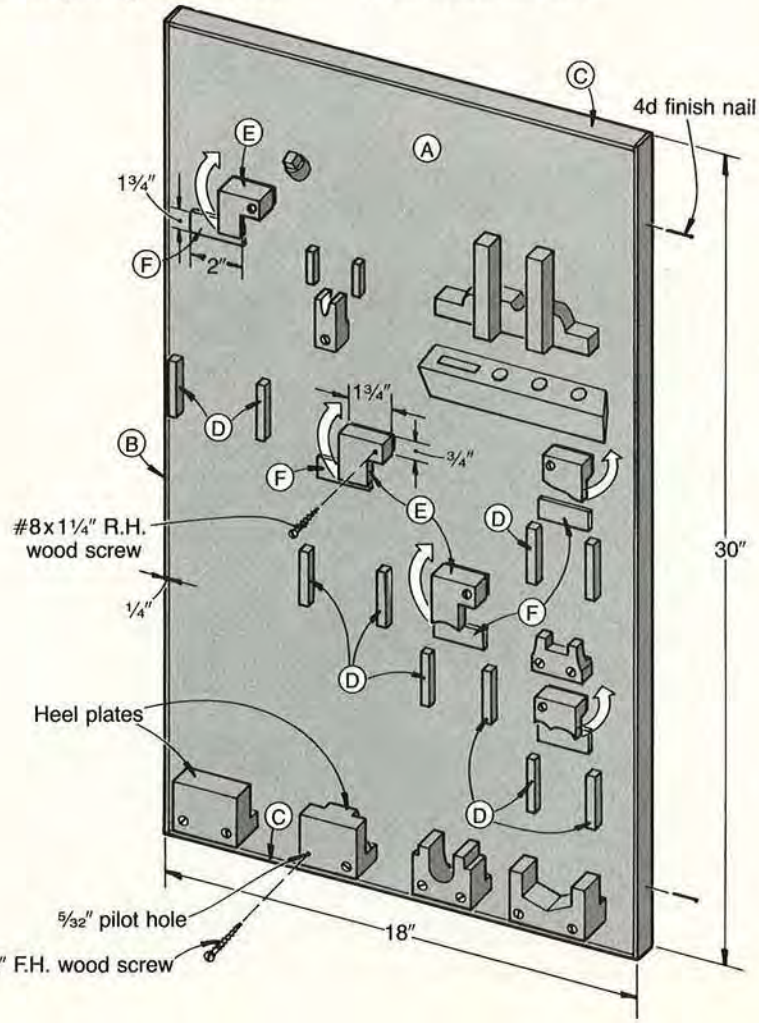
Storing planes on our rack not only keeps them conveniently together, it also safequards the blades against getting nicked. And, it makes a handsome display as well.

***Note:** The final size of your plane rack and the position of each plane on it will depend on the size and number you have. Use the photo and drawings of our rack as a guide to build one to suit your needs.*

1 Cut the backboard (A), trim pieces (B, C), positioners (D), rotating hold-downs (E), and lift pads (F) to size. Cut the heel plates to fit your planes (we formed ours to keep the plane heel from sliding left or right).
2 Cut the supports for the router plane and cutters if needed.
3 Position your planes on the backboard and mark the location of the positioners, rotating hold-downs, and heel plates.
4 Drill pilot holes and screw the heel plates to the backboard. Glue the lift pads in position; glue and nail the positioners in place.
5 Paint the backboard assembly and apply a clear finish to the trim and hold-downs. Screw the hold-downs in position, leaving the screws a bit loose so the hold-downs will rotate. Attach the trim.
6 Drill holes through the backboard; fasten rack to the wall.

Project Design: Jim Boelling
Photograph: Bob Calmer
Illustration: Bill Zaun





Bill of Materials

Part	Finished Size T	W	L	Material	Qty.
A	¾"	17½"	29½"	plywood	1
B	¼"	¾"	30"	pine	2
C	¼"	¾"	17½"	pine	2
D	⅜"	⅜"	2"	pine	10
E	¾"	1¾"	1¾"	pine	3
F	¼"	¾"	2"	pine	5

Supplies: #8x1¼" roundhead wood screws, #8x1½" flathead wood screws, 4d finish nails, paint, clear finish.

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If you're saving back issues of WOOD magazine for future use, save this index. We've located it in the center of the magazine so you can easily remove it. We've tried to keep the index easy to use, too. For example, after the subject "Block Puzzle" you'll see the numbers, 15:46-47. That simply means you can find the article on pages 46 and 47 of issue 15. And since "Block Puzzle" happens to be a project, you also can find it listed in the special "project index" on page 56.

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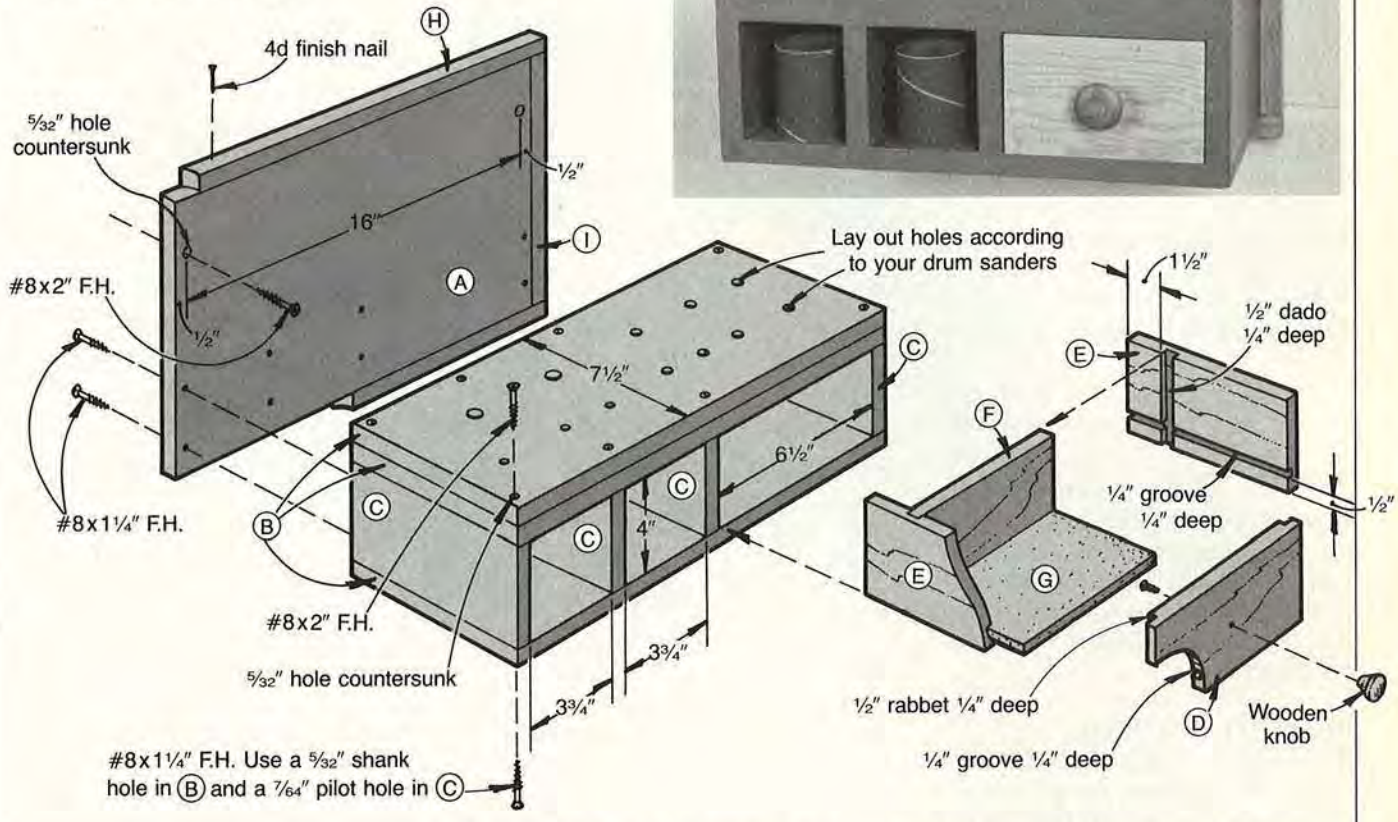
Compiled by Eugenia F. Slone

ANOTHER GREAT SHOP ORGANIZER

DRUM-SANDER HOLDER

Print this article

Tired of sanding drums and sleeves rolling around your shop — or worse yet, not being able to find them? Solve the problem in a hurry with our wall-mounted holder. The drum shafts fit in holes in the top, and there's plenty of room below for the sanding drum sleeves.



Bill of Materials					
Part	Finished Size			Material	Qty.
	T	W	L		
A	3/4"	11"	17"	particle-board	1
B	3/4"	7 1/2"	17"	particle-board	3
C	3/4"	4"	7 1/2"	particle-board	4
D	1/2"	3 15/16"	6 7/16"	pine	1
E	1/2"	3 15/16"	7 1/4"	pine	2
F	1/2"	3 3/16"	5 15/16"	pine	1
G	1/4"	5 15/16"	7 1/4"	hardboard	1
H	3/4"	3/4"	18 1/2"	pine	2
I	3/4"	3/4"	11"	pine	2

Supplies: #8x1 1/4" flathead wood screws, #8x2" flathead wood screws, wooden knob, 4d finish nails, masking tape, paint

1 Cut the back (A), storage box tops and bottom (B), and dividers (C) to size. Laminate the two top pieces. Lay out and drill 1"-deep holes in the top to house the shanks of your drum sanders.

2 Glue and clamp the storage box together. Drill shank and pilot holes, and drive the screws.

3 Cut the drawer front (D), sides (E), back (F), and bottom (G) to size. Cut or rout a 1/4" groove 1/4" deep 1/2" from the bottom in the drawer front and sides. Cut a 1/2" dado 1/4" deep 1 1/2" from the back edge of each side. Finally, cut a 1/2" rabbet 1/4" deep along both ends of the front piece.

4 Glue and clamp the drawer together, checking for square. Drill a hole through the drawer front and attach a knob.

5 Cut trim pieces (H, I) to size; glue and nail them to the back (A).

6 Glue and clamp the storage box to the back piece. Drill shank and pilot holes from the back side of the back piece into the back of the box, and screw the back to the box.

7 Mask off the trim pieces and paint the storage box and back. Remove the masking tape and apply a clear finish to the trim and drawer.

8 Drill mounting holes through the back piece, and fasten the holder to your shop wall.

Project Design: Bill Lovelace
Photograph: Bob Calmer
Illustration: Kim Downing; Bill Zaun

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SUNBURST DINING TABLE

As part of my job here at *WOOD*, I monitor the progress of each project as it goes together in the shop. As I began to see this dinette table take shape, I had a hunch it was going to be a winner. I was surprised, too, that the construction techniques looked very "doable". As it turns out, I was right on both counts. The 48" table fits right in with the rest of the furniture in my house, and my wife loves the matched oak-grain top and the sturdy, walnut-accented base.

Marlen Kemmet
How-To Editor

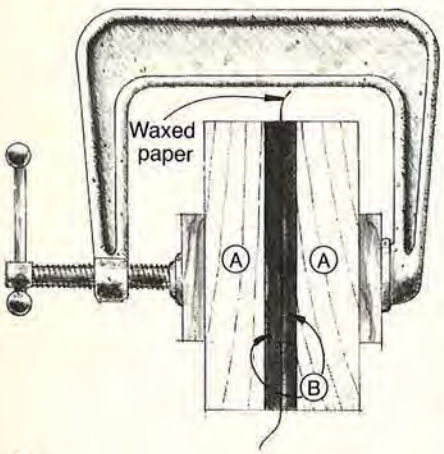
BEGIN WITH THE BASE

Note: *You'll need some 1/8" walnut for this project. You can either resaw or plane thicker stock to the correct thickness or special order it. See the Buying Guide on page 60 for our source.*

HOW TO CUT AND LAMINATE THE LEGS

1 Cut the leg parts (A, B, C) to size plus ½" in width and 1" in length from ¾" oak stock.

2 Spread an even coat of glue on the mating surfaces, then clamp eight A-B laminations together as shown in the sketch *below*. Now, glue and clamp four C-C laminations together for the legs. (We used a 2" disposable paint roller to apply the glue.)



3 Plane the *oak* face of each A-B lamination to reduce the thickness to ¾". (As shown in the sketch *below*, we used a push block and push stick, and made several shallow cuts on the jointer to safely plane the lamination to size.)

4 Trim the C-C laminations to a finished length of 21". Glue and clamp a C-C lamination centered from end to end between a pair of A-Bs for each of the four legs; make sure the edges are flush.

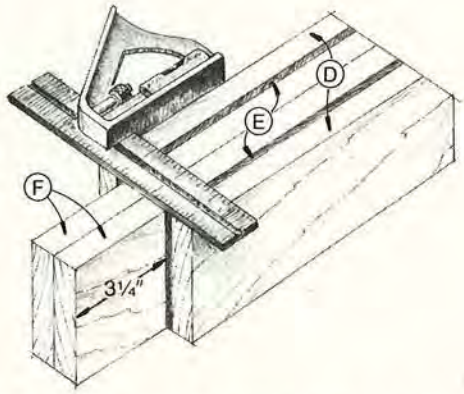
5 After the glue dries, remove the clamps and scrape off the excess glue from *one* edge of each lamination. Set the table saw fence 3⅜" from the blade, and with the scraped edge against the fence, rip *one* edge of each of the four legs. Now, position the table saw fence 3¼" from the blade and rip the *opposite edge* to cut the legs to finished width.

6 Finally, crosscut the legs to length so the open mortise on each end of each leg measures 3¼" long. Remove any excess glue from the mortises with a sharp chisel.

CUTTING AND LAMINATING THE FEET

1 To cut and laminate the feet (D, E, F), use the same procedure outlined in steps 1, 2, and 3 of the previous section.

2 Now, trim one end of the four F-F laminations square. Glue and clamp each of them between a pair of D-E laminations, with the D-E laminations flush with each other and 3¼" from the squared end of the F's as shown *below*.



3 Again, using the two-step ripping procedure used on the legs (see step 5 of the previous section), rip the feet to width (3¼"). Crosscut the feet to length (12"). Remove any excess glue from the tenons.

4 Cut the large chamfer on the end of each leg (we cut ours on the radial arm saw).

FORMING THE CROSSMEMBERS AND TABLETOP SUPPORT

1 Cut the outside crossmember parts (G) to size plus ½" in width, and cut the inside parts (H) to size plus ½" in width and 1" in length.

2 Glue and clamp the two H-H laminations together. Later, trim both ends of both laminations for a finished length of 18½".

3 Glue and clamp an H-H lamination between two G's for each crossmember. Keep the ends of the two outer pieces flush with each other, using the same squaring technique used with the feet (see step 2 of the previous section).

Sit back and enjoy the feast and festivities on the matched-grain oak table supported by the attractive walnut-striped base. Simply lay out the pattern on plywood, then cut the parts with your router.

4 Cut a 3″-wide notch 1⅝″ deep centered along the length of each crossmember where shown on the Exploded-View Drawing.
5 Cut the support pieces (I, J) to size. Cut or rout a 45° chamfer on both ends of I and on one end of each J. Put the support pieces aside for now; you'll use them later.

NOW, ASSEMBLE THE BASE

1 Glue and clamp one foot to each leg, checking for square.
2 Glue and clamp two legs to one of the crossmembers, making sure the notch faces *up*, again checking for square. Repeat with the other two legs and crossmember, making sure the notch faces *down*.
3 Interlock the two notched crossmembers, and glue and clamp the two leg assemblies together to form the base.
4 Center and clamp the tabletop support pieces to the top of the oak base. To mount the supports to the base, drill screw holes from the top side of the support pieces to the sizes noted on the Exploded-View Drawing. Then, screw the supports to the base assembly with wood screws.

BUILDING THE TOP

Note: *The following routing procedures used to rout the plywood top and oak band require sharp carbide-tipped bits. Make several passes, lowering the bit no more than ¼″ per pass to make the cuts. See the Buying Guide on page 60 for our source of router bits.*

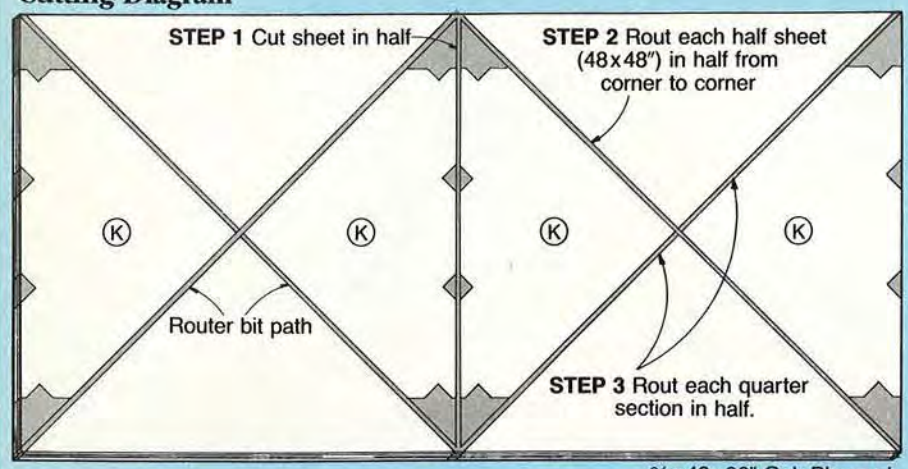
FORMING THE PLYWOOD TOP

1 Start by cutting a sheet of 4x8′ oak veneer plywood in half where shown in Step 1 on the Cutting Diagram.

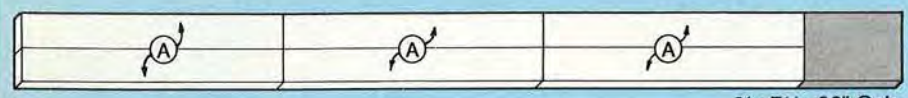
Continued

DINING TABLE

Cutting Diagram

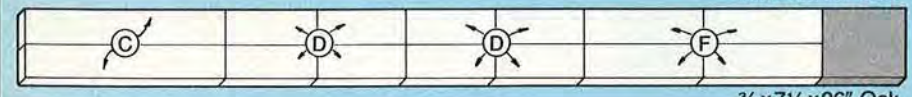

STEP 1 Cut sheet in half
STEP 2 Rout each half sheet (48x48") in half from corner to corner
K
K
K
K
Router bit path
STEP 3 Rout each quarter section in half.

¾x48x96" Oak Plywood

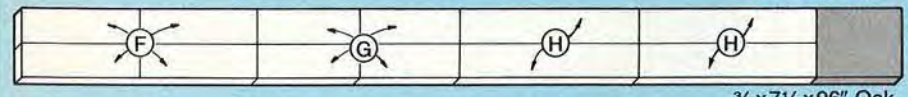


¾x7½x96" Oak

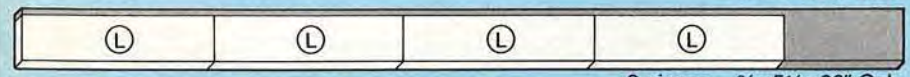
¾x7½x96" Oak



¾x7½x96" Oak

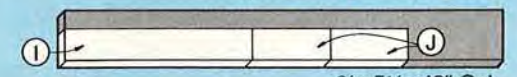


¾x7½x96" Oak

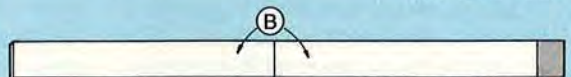


2 pieces— ¾x5½x96" Oak

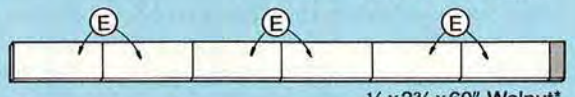
2 pieces— ¾x5½x96" Oak



¾x5½x48" Oak



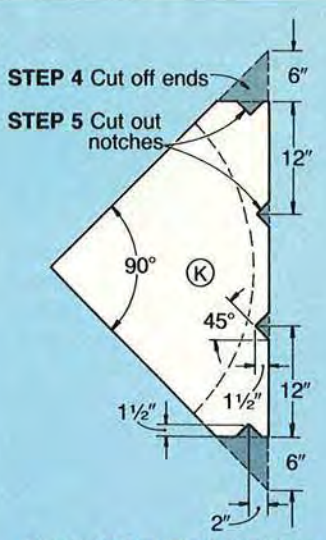
4 pieces— ⅛x3¾x60" Walnut*



⅛x3¾x60" Walnut*

⅛x3¾x60" Walnut*

*See Buying Guide at *left* for our source.



PLYWOOD SECTION (Top view)

Bill of Materials

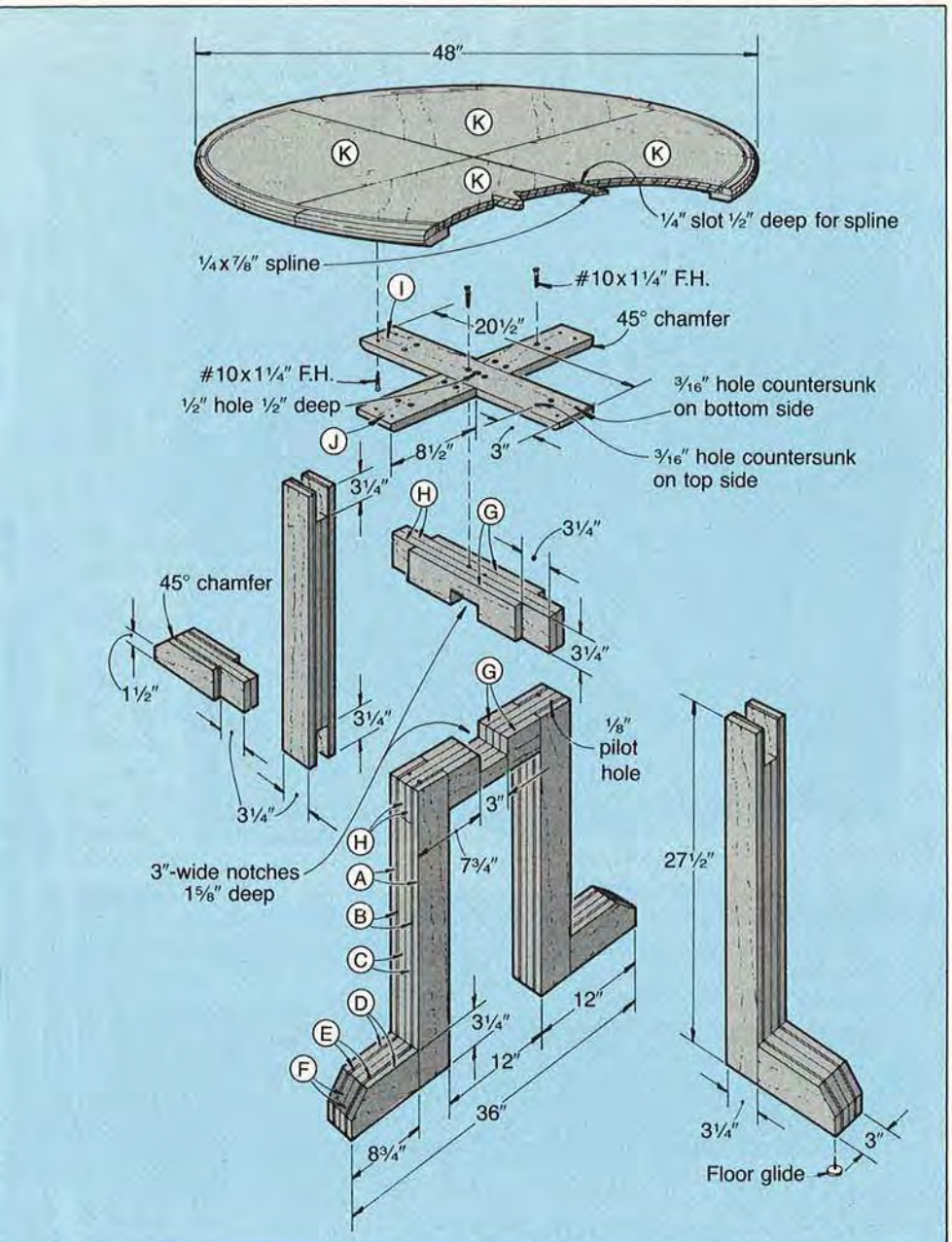
Part	Finished Size*			Material	Qty.
	T	W	L		
A*	¾"	3¼"	27½"	oak	8
B*	⅛"	3¼"	27½"	walnut	8
C*	¾"	3¼"	21"	oak	8
D*	¾"	3¼"	8¾"	oak	8
E*	⅛"	3¼"	8¾"	walnut	8
F*	¾"	3¼"	12"	oak	8
G*	¾"	3¼"	12"	oak	4
H*	¾"	3¼"	18½"	oak	4
I	¾"	3½"	20½"	oak	1
J	¾"	3½"	8½"	oak	2
K*	¾"	36"	24"	oak plywood	4
L*	¾"	5¼"	20⅜"	oak	8
M*	¾"	5¼"	20⅜"	oak	8
N*	⅛"	¾"	34 9/16"	walnut	4

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: #10x1¼" flathead wood screws, ½" dowel stock, 4 — floor glides, stain (if desired), finish

BUYING GUIDE

- **⅛" walnut.** For all walnut parts, $24. Wyndham Woods, P.O. Box 506, Ellettsville, IN 47429, 812/876-4960.
- **Router bits.** ¼" slot cutter, carbide tipped, cat. no. 10, $14. 45° chamfer bit, carbide tipped, cat. no. 12, $15. ½" straight bit, carbide tipped, cat. no. 27, $7. MLCS, P.O. Box 53, Rydal, PA 19046, 800/533-9298 (In PA 800/346-7511 ext. 56) to order.



2 Draw a diagonal line on both 4x4' pieces of the oak plywood. (We laid the plywood on a half sheet of particleboard because the last routing cut needs to go into the particleboard about 1/8" for a clean cut through the plywood. Also, routing results in less chipping than if cutting with a saw.) Now, clamp a straight board to the plywood, fit your router with a 1/2" carbide-tipped straight bit, and rout down the center of the marked diagonal to cut both half sheets in half again (see Step 2 on the Cutting Diagram).

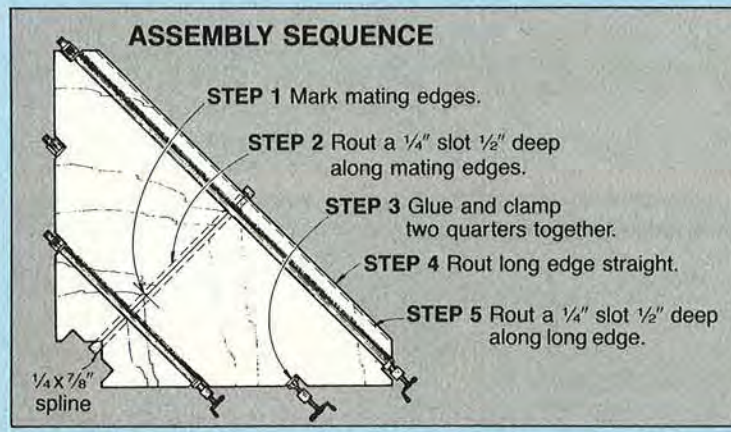
3 Reposition your fence and rout the four triangular pieces in half where shown in Step 3 of the Cutting Diagram.

4 Referring to the Plywood-Section Drawing, use a jigsaw to cut off the ends of each plywood section (K) where shown in Step 4. Cut the notches where shown in Step 5 on the drawing.

JOINING THE PLYWOOD PIECES

1 Arrange the four plywood sections (K) to achieve the best grain pattern, and mark the mating edges where shown in Step 1 of the Assembly-Sequence Drawing *below*. Now, rout a 1/4" slot 1/2" deep along the mating edges of the two adjacent panels where shown in Step 2. Repeat this procedure for the other pair.

2 Cut four 1/4" splines 7/8" wide by 24" long. Check the fit of the splines in the 1/4" grooves.


ASSEMBLY SEQUENCE
STEP 1 Mark mating edges.
STEP 2 Rout a 1/4" slot 1/2" deep along mating edges.
STEP 3 Glue and clamp two quarters together.
STEP 4 Rout long edge straight.
STEP 5 Rout a 1/4" slot 1/2" deep along long edge.
1/4x7/8" spline

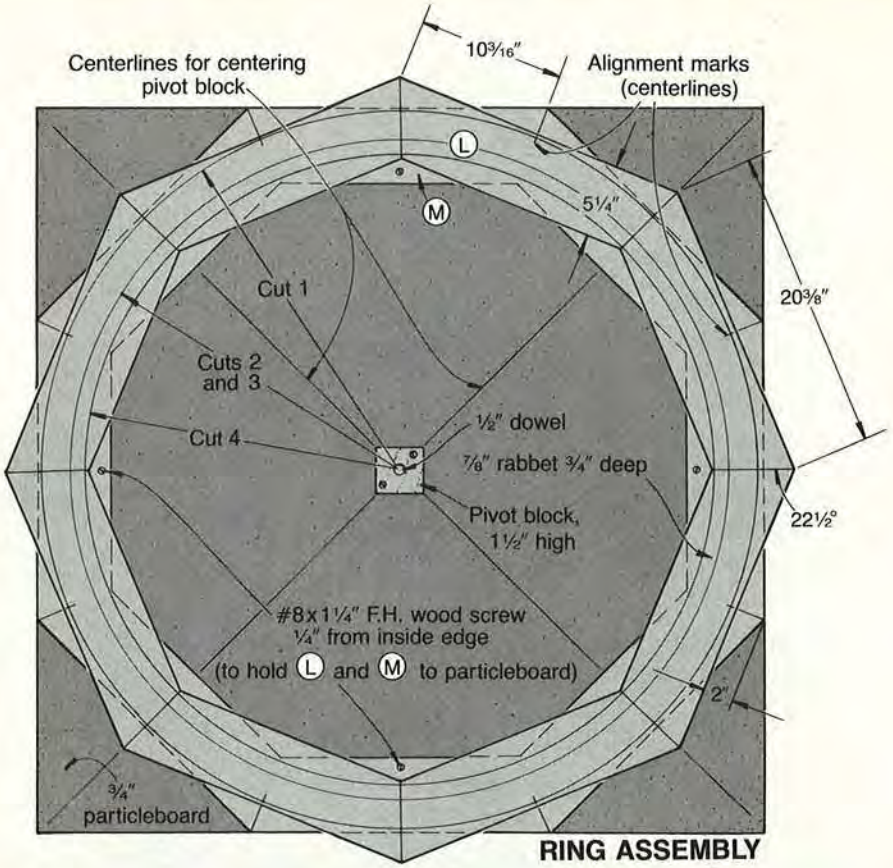
Clamp the two table halves together.

Continued

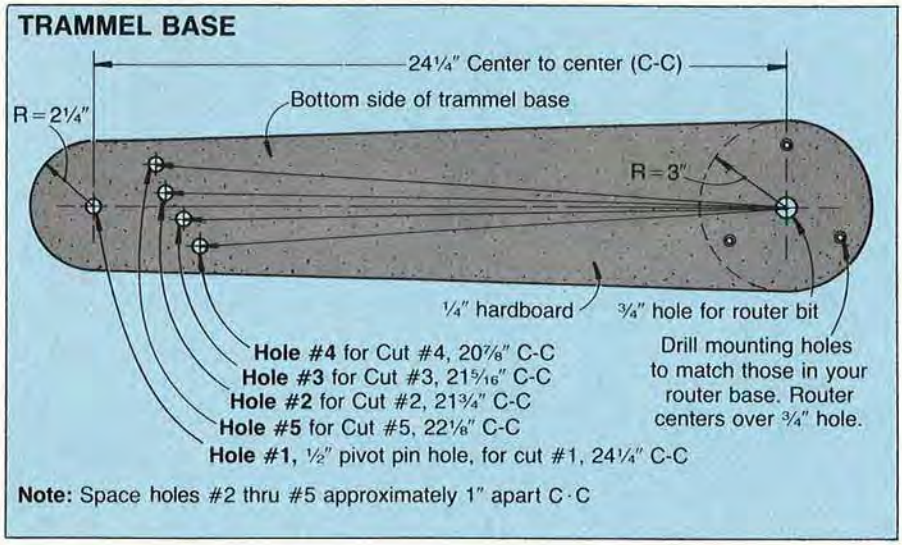
3 Glue, spline, and clamp two of the plywood quarter-sections together. Use the notches cut in the plywood to hold the heads of the clamps as shown in Step 3 on the Assembly-Sequence Drawing, alternating the clamps to equalize the pressure. Be *careful* to keep the long edge flush. Glue and clamp the other two pieces.
4 Using a straight board as a fence, a ½" straight bit, and a backing board on the bottom to prevent routing into your workbench top, rout several shallow passes to trim 1/16" off the long edge (Step 4) to ensure a perfectly straight edge. Repeat on the other plywood section.
5 Rout a ¼" slot ½" deep along the long edge of each half section (Step 5).
6 Glue, spline, and clamp the two halves together as shown in photo A on the previous page. (As you can see in the photo, our notches were not exactly the same as shown on the drawings. When gluing the panels together, we found that a few more notches would have been helpful.)

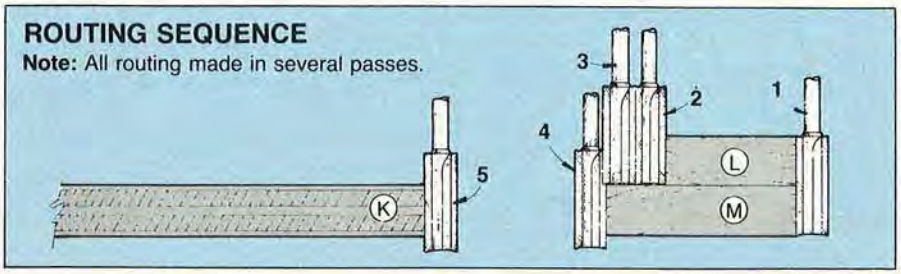
BUILDING THE SOLID OAK BAND

1 Rip and crosscut 16 pieces of ¾" oak to 5¼x21" for the upper band pieces (L) and lower band pieces (M).
2 Miter-cut the ends of each piece at a 22½° angle for a 20⅜" finished length. (We miter-cut eight pieces of equal-length scrap and clamped them together to ensure an accurate angle setting.)
3 Glue and clamp the top band together. (We laid the pieces on waxed paper on a half sheet of particleboard and band-clamped them together. Then, we clamped each band piece to the particleboard to ensure a flat band.) Later, repeat this process for the lower band.
4 Make alignment marks (see the Ring-Assembly Drawing) at the centerline of several of the upper band pieces (L). Position one band on top of the other one, aligning the marked centerlines of the top



RING ASSEMBLY


TRAMMEL BASE
24¼" Center to center (C-C)
Bottom side of trammel base
R=2¼"
R=3"
¼" hardboard
¾" hole for router bit
Drill mounting holes to match those in your router base. Router centers over ¾" hole.
Hole #4 for Cut #4, 20⅞" C-C
Hole #3 for Cut #3, 21⅝" C-C
Hole #2 for Cut #2, 21¾" C-C
Hole #5 for Cut #5, 22⅛" C-C
Hole #1, ½" pivot pin hole, for cut #1, 24¼" C-C
Note: Space holes #2 thru #5 approximately 1" apart C-C



Apply glue, then align and clamp the two oak bands together.

Mount the trammel and rout the laminated-oak band to shape.

band pieces with the joint lines of the bottom band. Glue and clamp the bands together as shown in photo B *above*.

BUILDING THE TRAMMEL BASE AND ROUTING THE OAK BAND ROUND

1 Cut the trammel base to shape, and drill the five pivot-pin holes where dimensioned on the Trammel Base Drawing. Remove the plastic subbase from your router and mount the trammel base in its place.

2 To make the pivot block for the trammel base, cut two pieces of ¾" scrap to 3x3". Glue and clamp together, draw diagonals, and drill a ½" hole through the center of the block.

3 Lay the oak bands on a piece of particleboard with the upper band on top. Then, drill shank and pilot holes through the lower band pieces (L) where shown on the Band-Assembly Drawing. Screw the band to the particleboard.

4 Locate and mark the center of the band on the particleboard (we used a long straightedge to draw lines between the opposite joint lines to find center). Center the hole in the pivot block directly over the center point, and screw the block in position. Glue a 4" length of ½" dowel in the hole in the block.

5 Chuck a ½" carbide-tipped straight bit into your router. Position pivot-pin hole #1 on the ½" dowel in the pivot block. Rout ¼" deep into the oak band to start forming the outside to shape as shown in photo C *above* and on the Trammel Base and Routing-Sequence Drawing. Lower the bit about 3/16" per pass until you have cut through the band.

6 Using trammel base hole #2 and then #3 on the pivot block, rout the 7/8" rabbet ¾" deep where shown on the Trammel-Base and Routing-Sequence Drawing. (We checked the depth of the rabbet on a scrap piece of oak plywood.) Using hole #4, make several passes to cut through the band to form the inside circumference.

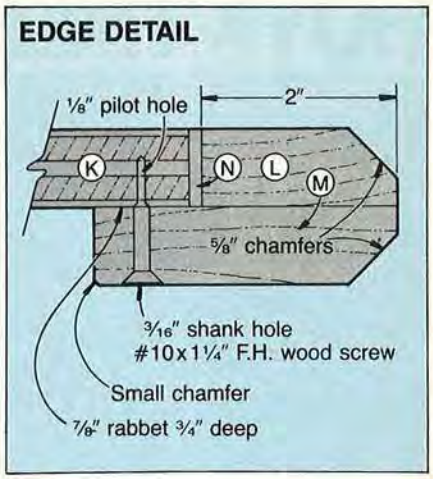
7 Remove the band from the particleboard, and rout a chamfer on the top and bottom outside edge of the oak band with a chamfer bit (see the Edge Detail *above right*).

8 Finally, rout or sand a slight chamfer on the bottom inside edge of the bottom band.

ROUTING THE PLYWOOD TOP

1 Remove the pivot block from the particleboard. Lay the plywood top, good side down, on the particleboard. Drill a ½" hole ½" deep at the exact center (where the joint lines converge) of the top. Glue a ½" dowel 3" long in the hole.

2 Using hole #5 in the trammel base, rout the plywood top to shape, again cutting through the ¾" thickness in several passes. Trim the ½" dowel so it protrudes ½"; you'll use the dowel later to center the tabletop on the base.



NOW, FINAL ASSEMBLY

1 Center the plywood top in the 7/8" rabbet in the oak band. Measure the width of the gap, and cut a 10" scrap test strip to the measured width. Crosscut the strip into four short spacers, and position the spacers in the gap around the plywood to check for a proper fit and to center the plywood. Adjust the width if necessary, and then cut the four walnut strips (N) to 34 9/16".

2 Drill shank and pilot holes to the sizes noted in the Edge Detail *above*, and fasten the oak band to the plywood top.

3 Put glue in the gap and insert the walnut strips. You may need to trim the last strip before insertion for a tight fit.

4 *Being extremely careful not to go through the veneer*, plane, scrape, and sand the walnut strips flush with the plywood top.

5 Finish-sand the base and tabletop. Stain and finish as desired.

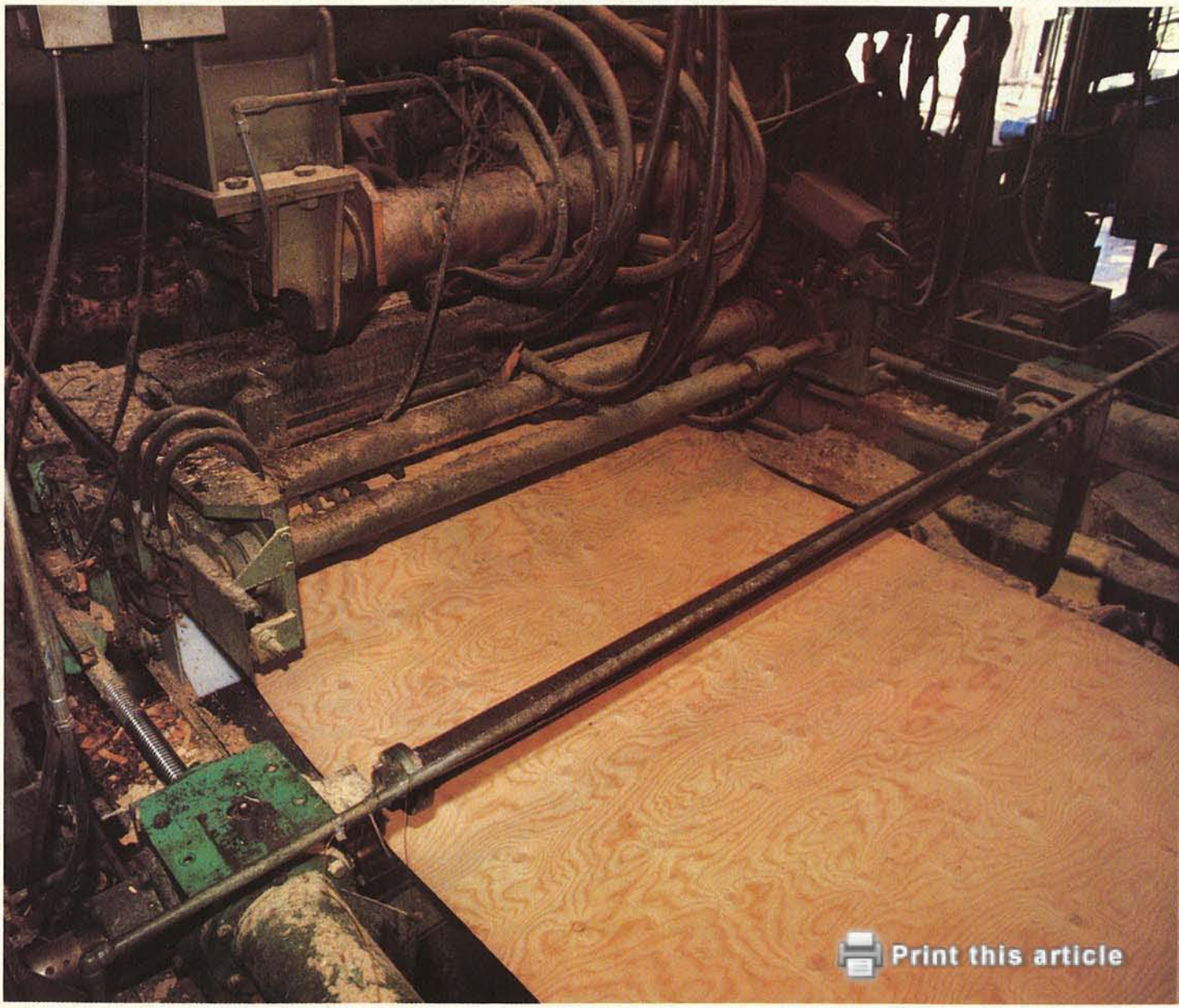
6 Drill a ½" hole ½" deep in the center of the tabletop support to align the tabletop with its protruding ½" dowel.

7 Center the tabletop on the base, and drill shank and pilot holes through the bottom of the supports into the bottom of the tabletop. Counterbore the screws. Attach the tabletop to the base, and attach the floor glides.

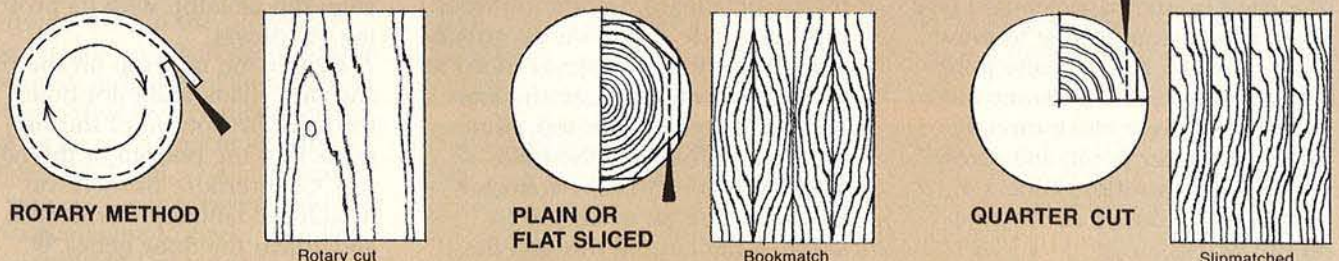
Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Bob Calmer
Illustrations: Kim Downing; Bill Zaun

PEELING LOGS LIKE APPLES

HOW THEY MANUFACTURE ROTARY-



COMMON VENEER CUTTING METHODS, APPEARANCE, AND APPLICATIONS



Rotary-cut veneers — All softwood plywood face and backs, veneer cores, and less-expensive hardwood plywood face and backs.

Plain-sliced (flat-sliced) and quarter-cut veneers — Laid down in pleasing patterns for hardwood plywood face and backs, architectural panels.

CUT SOFTWOOD PLYWOOD

Thin ribbons of rotary-cut veneer, laid up in sheets, make up today's softwood plywood that fills the bill for many projects — from home remodeling to shelving. In this visit to a plywood mill, you'll learn how modern production keeps softwood plywood a strong, versatile, and affordable material.

There's a big difference between softwood plywood and hardwood plywood — besides price. Bruce Haliburton, plywood marketing manager for Georgia-Pacific Lumber Co. in Portland, Oregon sums up the distinction: "Hardwood plywoods have a more pleasing design appearance." And he's right. The thin veneers of cabinet woods such as cherry, oak, maple, pecan, walnut, and other species are specially made. To form the attractive, decorative, and natural patterns on one or both sides of the sheet, the slower plain cut or quarter cut technique will often be used (see diagrams, opposite page). In contrast, the seamless, rotary-cut top ply of a softwood plywood panel looks quite unnatural.

There's a difference, too, in how some hardwood plywood sheets are manufactured. While you'll find softwood plywood normally made with only a veneer core, hardwood plywood may be bought with cores of solid, edge-joined lumber, particleboard, or fiberboard, as shown *below.* Each type of core material has its merits for different applications, but veneer core usually gets the nod for overall strength and versatility. (For comparisons, see "Should You Be Using Hardwood Plywood?" *WOOD* Magazine, Aug. '85, p. 55.)

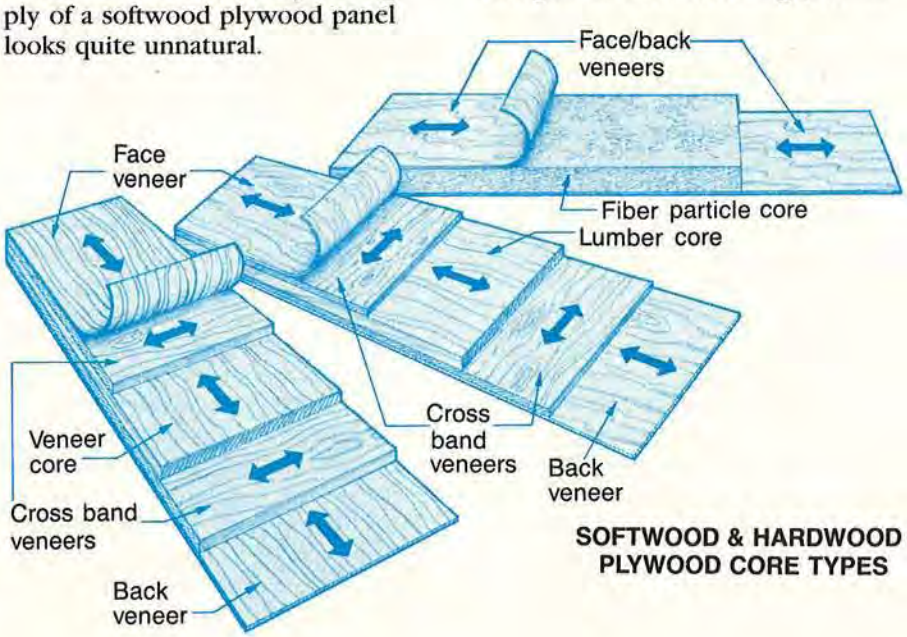
Despite softwood plywood's ugly-cousin role, this material remains the workhorse of home construction, inexpensive do-it-yourself projects, and yes, even furniture and cabinet making. You'll also find most hardwood plywood constructed with a crossbanded core of rotary-cut, softwood veneers. Glue thin, hardwood veneers to the front and back of a softwood plywood sheet and presto, you've got hardwood plywood!

You'll never find mills far from the trees

Little more than 50 years ago, giant Douglas fir trees towering 300′ in height and up to 17′ in diameter made perfect candidates for the raw material of a new industry. Fledgling plywood makers focused on the efficiency of peeling long lengths and widths of wood, rather than sawing it. The wood's tough fibers didn't separate when shaved thin, and the veneers glued easily because they lacked excessive pitch and resins. Today, mills in the Northwest still feed on Douglas fir.

In the southeastern states, however, plywood manufacturing got a much later start. It wasn't until about 25 years ago that the plentiful yellow pine began yielding to the rotary-cutting knife. An adhesive had to first be developed that would hold this highly resinous wood together.

Now, you'll find southern pine plywoods stacked side by side in the marketplace with plywood made of Douglas fir. In fact, some large plywood manufacturers have plants in both parts of the United States. They found it more economically feasible to build plants near the raw material than to freight logs across country.



SOFTWOOD & HARDWOOD PLYWOOD CORE TYPES

Plywood begins as logs soaking in the sun

In Idaho's Emmett Valley, smoke billows high into the sky, pinpointing the boiler at Boise Cascade's Emmett plywood plant. It's one of dozens of such facilities in this corner of the nation. Although the valley itself relies on agriculture, the plywood plant thrives on the forests of Douglas fir blanketing the surrounding hills and mountains.

"In this part of Idaho, we get only second-growth fir, timber that has regrown following earlier logging," explains Jack Stevens, assistant plant manager. "Because the stands of trees aren't as dense as the first-growth forests closer to the coast, the trees have many more branches. This translates into more knots. So, we produce strictly lower grade sheets. But no

Continued

ROTARY-CUT SOFTWOOD PLYWOOD

matter what the veneer quality, all softwood plywood will be made the same way."

In the sprawling acres of mill yard outside the plant, fir logs brought in from miles around make up a giant, seemingly endless woodpile. As the logs bask in the summer sun, sprinklers rain water on them to prevent their drying out and splitting.

Logs actually start their trip through the mill at the debarker. Here, huge claws strip them of bark in seconds. From there, they move to a monstrous, 7′-diameter cutoff saw. Here each log gets trimmed to a routine 103″ length. The bark and waste wood removed from the logs fuel the plant's boiler. The skinned and trimmed logs head for the next step — conditioning.

Years ago, logs were soaked in a pond so they would peel easier. Today, they're softened up in a steam room, photo A. Much like a huge shower stall, the steam room engulfs the logs in a spray of hot, 160° F. water for eight hours. During cold Idaho winters, this steaming process also serves to thaw out frozen logs. So, when the temperatures drop, time in the steam room increases.

A computer directs the peeling process

As a log tumbles onto the lathe bed from a conveyor, specialized measuring equipment immediately sizes it and feeds the information to the computer. In turn, the computer locates the log's center points on the ends, then directs its advance to the between-centers position where head and tail stock spurs grab hold. Locked in place, the log begins to spin, awaiting contact with the blade.

Slowly, from his perch far above the plant floor, the lathe operator eases the long cutting blade against the spinning log. At first in contact with only the high points of the log's surface, the blade shears irregularly. But as the log quickly shears to a perfectly cylindrical shape, a continuous unbroken ribbon of ⅛″-thick veneer as wide as the log comes off, opening photo and B. In less than 60 seconds, nothing remains but the small core, which some mills sell as fence posts (here, they end up as fuel). The yield? An uncut veneer ribbon from a single log stretching up to 200′ or longer!

At a large clipping machine down the line, the veneer ribbon gets sliced into manageable-size sheets, or plies, measuring 54x101″. Workers sort these plies, as well as smaller "tailing" veneers that will be used for butted-up cross plies, into three categories — heartwood, light sap, and heavy sap. Each category has a different moisture content, so drying times vary. The separated plies will be dried accordingly in the 200′-long dryer which operates at 400° F.

Grading veneers by knotholes

The Hardwood Plywood Manufacturers Association (HPMA) sets the grading standards of hardwood plywood by appearance of face and back veneers. But most softwood plywood falls into the realm of the American Plywood Association (APA). Their grading standards become a knotty affair. (See softwood plywood grading, bottom, next page.)

Since this mill manufactures exclusively unsanded, engineered grade, or construction plywood, the number of knots in each ply, and their size, determine where it will be used. Plies with occasional knots up to 1″ diameter become C-grade veneers. Those with larger knots become D-grade veneers, used as core and back plies. Workers quickly learn to spot the difference and sort the sheets into piles by grade, photo C.

Building up plywood along the line

Graded and separated, the plies move to the assembly belt. Along this "lay up" line, a metallic-fingered machine first sets the higher-quality sheets down for the face plies. A layer of an exterior glue comes next, photo D. As the sheets being built up move on down the line, the process repeats itself for cross plies and the final back ply, photo E. The glue between each ply goes down in streams — like toothpaste — and prompts the assistant plant manager's explanation.

"We call it 'foam glue,' " says Jack. "When it hits the air, it reacts like shaving cream out of a can, foaming and expanding. We mix it right here on the spot."

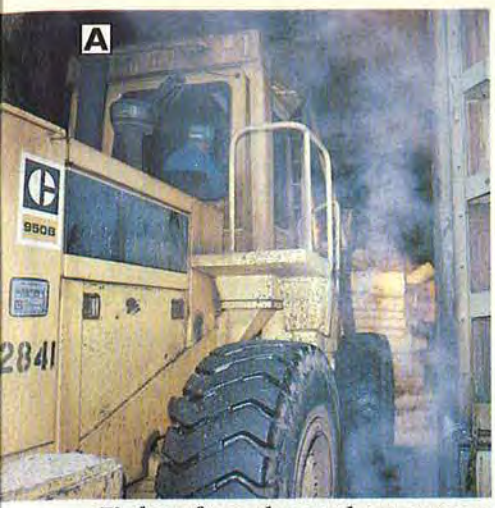
Pulling out the "recipe," Jack lists the exterior glue's ingredients: water, resin mixed with formaldehyde, caustic soda to penetrate the wood fibers, wheat flour as adhesive and filler, emersol for the foam, and blood. Pointing to the stacked bags of dry animal blood, Jack notes that blood has a tenacious adhesive quality.

A bond stronger than the wood in the plies

To make the bond between the glue and veneers strong enough to stand the rigors of construction, the would-be plywood must be pressed and heated. The plywood press itself rises two stories above the plant's floor, photo F. With 175 psi pressure, it forces the individual veneers of a sheet together, then bakes them at 300° F. for over three minutes. From his platform elevator, the press operator feeds the raw material in between the heated platens and removes the new plywood after baking.

Back on the production line, the plywood moves to the panel saws for trimming to finished size. Finally, the rectangular 4x8′ plywood sheets receive a last inspection, then come off the line, as shown in photo G.

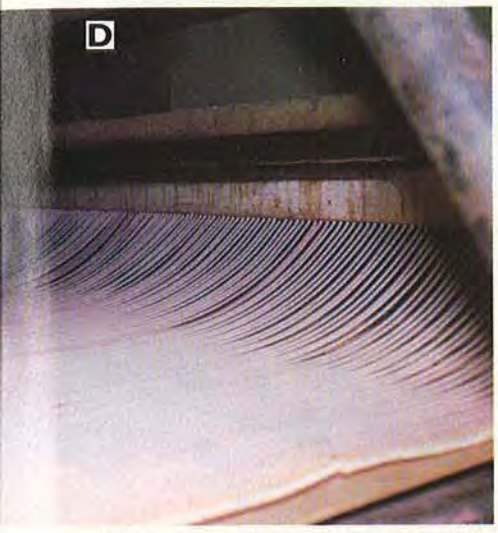
Later, in his office, Jack holds out the results of another inspection. Over the only slightly muffled roar of the plant, he says: "These are samples of our plywood we sent to APA for testing. Each has been partially sawn through, then broken apart. Ideally, the plywood shouldn't break on the glue line — the wood fibers should pull apart first. The glue should be as strong or stronger than the wood itself." His samples passed the test.



Fir logs from the yard get a steam bath to soften them for peeling.

The lathe blade reduces log after log to mere fence posts.

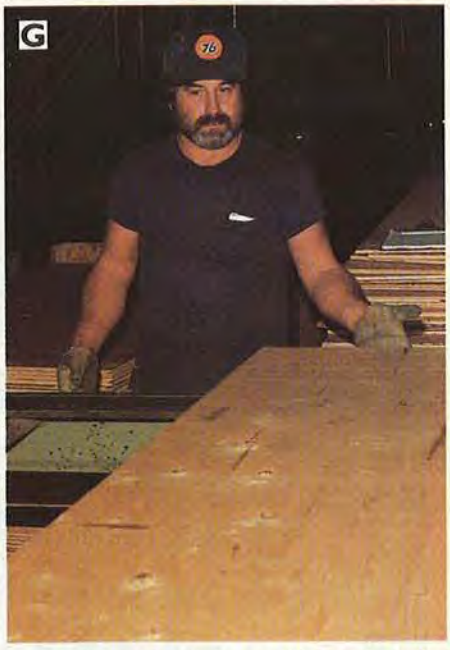
Fresh from the drying oven, plies get sorted on the roundtable.



Glue goes down between plies like ribbons of toothpaste.

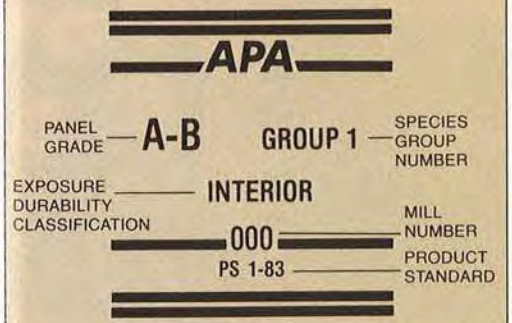
After checking for voids on cross plies, a worker lays the back ply.

The two-story press bakes and squeezes the laid-up plies.



Inspectors check to see if sheets meet grading specifications.

HOW TO READ A SOFTWOOD PLYWOOD GRADE STAMP



Note: *"Species group number" refers to the classification of wood by strength and stiffness. Group 1 woods rate higher than Group 5 woods.*

SOFTWOOD PLYWOOD GRADING

The type of glue used to manufacture plywood panels determines their rating as exterior or interior. Next, softwood plywoods fall into one of two categories: engineered grades or appearance grades. Generally, engineered grades consist of exterior panels, made with weather-proof glue, for building construction. Appearance grades include interior panels for furniture and cabinet work.

Face and back veneers of all interior, appearance-grade softwood plywood (and some exterior grades) rate one of the following letter designations:

N = Very best, defect free; for use with clear finishes. Special order.

A = Sound, no knots or pitch pockets; football or strip patches allowed. Can stain or paint.

B = Small defects, round patches, may need filling. To be painted.

C = Numerous open defects and knots to 1″ diameter.

D = Lowest grade. Knots to 2 ½″ diameter, open defects, may have interior voids.

Written by Peter J. Stephano and David Donnelly
Photographs: David Donnelly; American Plywood Association
Illustrations: Jim Stevenson

YOU'LL BE SITTIN' PRETTY ON THIS

Print this article

SO-SWEET

SETTEE

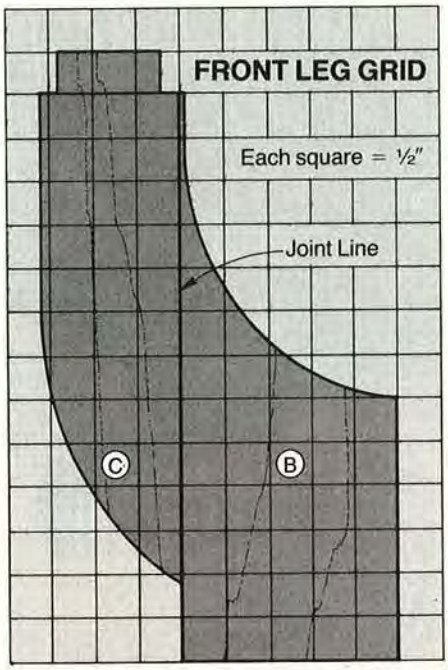
Whether you use it indoors as a hall bench or outdoors as a fine piece of lawn furniture, this settee will do the job admirably. The beauty and weather resistance of mahogany, plus the durability of mortise-and-tenon joinery add up to a sure pleaser.

STARTING OUT WITH THE LEGS

***Note:** You'll need 2½x2½" mahogany for the front and rear legs. You can either laminate thinner stock or special-order 3x3" turning squares and cut or plane them to 2½" square. See the Buying Guide on page 73 for our source. Also, if you plan to use the settee outdoors, be sure to use epoxy for the adhesive.*

1 Rip and crosscut two rear legs (A) and two front legs (B) to the sizes listed in the Bill of Materials. Chamfer both ends of the rear legs and the bottom end of the front legs. (We chamfered ours on the table saw with the blade at 45°.)

2 To form the curved section (C) of each front leg, refer to the two-step drawing at the bottom of the page and start by crosscutting a 12¾" length of 2½" square mahogany for the curved sections. Rip the piece to a 1⁹⁄₁₆" thickness. Then, lay out the two curved sections (including the tenons) on the stock, using the Front-Leg Grid *below* as a guide.

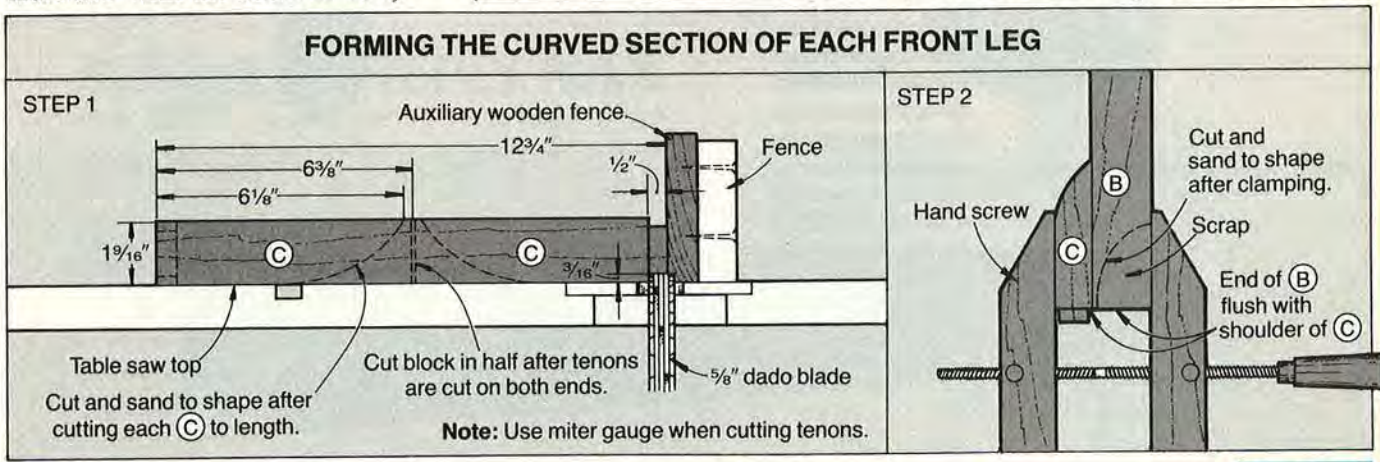


3 Mount a dado blade in your table saw, and cut a ½" rabbet ³⁄₁₆" deep all the way around each end of the length to form the tenons as shown in step 1. Then, cut the mahogany blank in half, and cut the two curved sections to shape on the band saw. Hand-sand the curved edge of each curved section smooth.

4 As shown in step two of the drawing, clamp parts B and C together, with the shoulder of the tenon of each curved section (C) flush with the top end of each front leg member (B). Later, remove the clamps, and lay out the curved shape on the front top edge of each front leg member (B), using the Front-Leg Grid as a guide. Cut to shape and sand smooth.

FORMING THE MORTISES IN THE LEGS

1 Mark the mortise center points on the two rear legs (A) and the two front legs (B) where shown on the Rear- and Front-Leg Drawings. (Remember that you are working in pairs of A's and B's, and that the mortises in one A must be a mirror image of those in the



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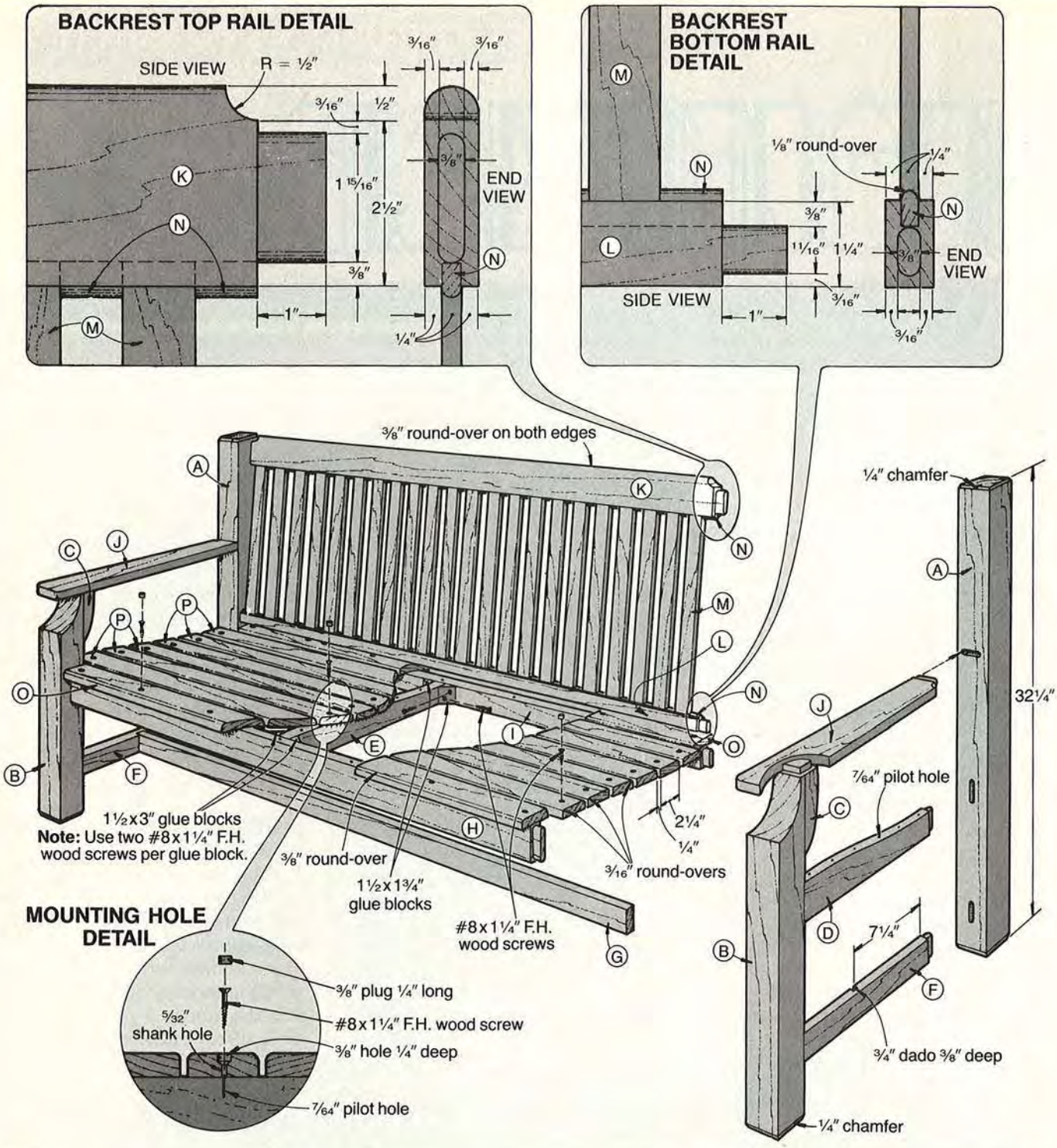
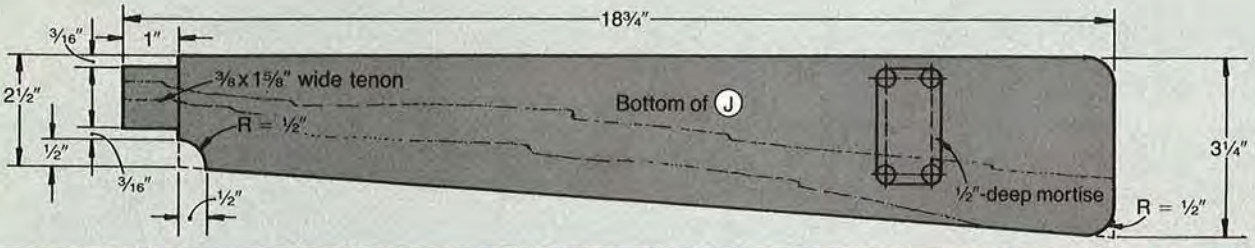
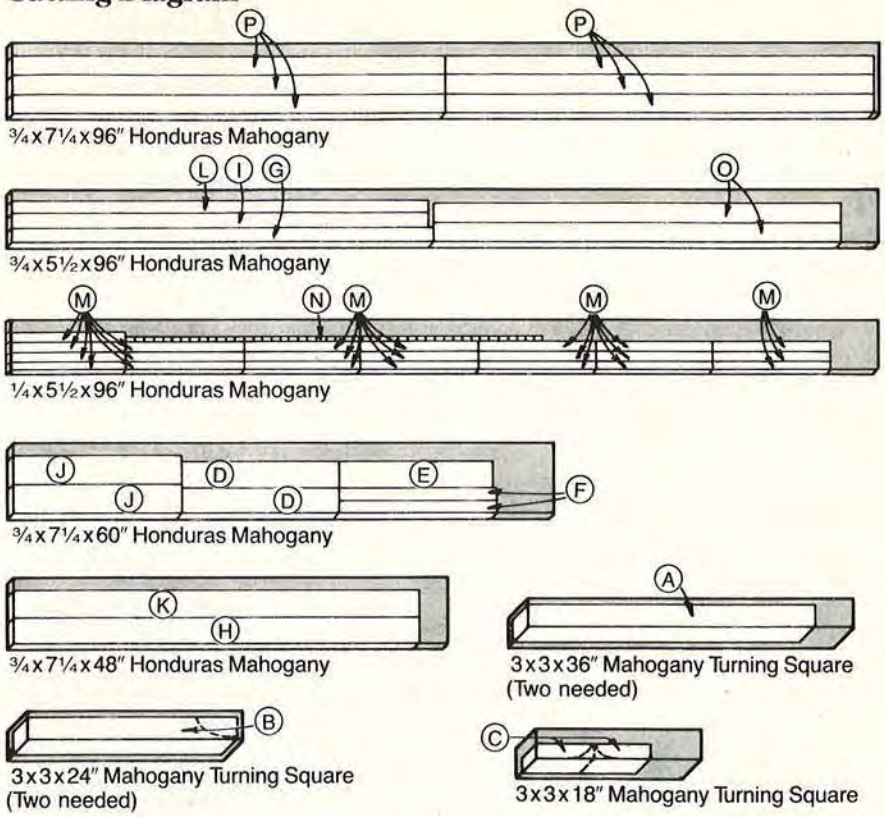


ARMREST (Bottom of right armrest shown)



Cutting Diagram



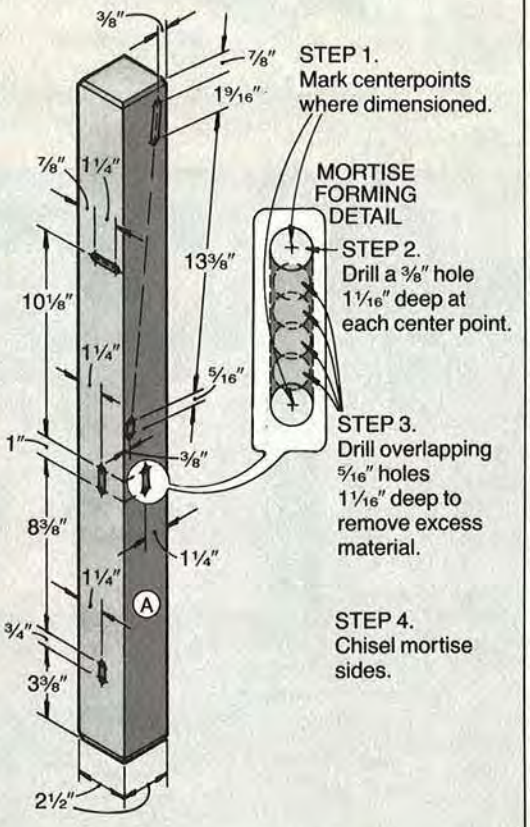
Bill of Materials

Part	Finished Size* T	W	L	Material	Qty.
A	2½"	2½"	32¼"	Hond. mahog.	2
B*	2½"	2½"	23¾"	Hond. mahog.	2
C*	1 9/16"	2½"	6⅛"	Hond. mahog.	2
D*	¾"	3"	17¼"	Hond. mahog.	2
E	¾"	3"	17"	Hond. mahog.	1
F	¾"	1½"	17¼"	Hond. mahog.	2
G*	¾"	1½"	46½"	Hond. mahog.	1
H	¾"	3"	46"	Hond. mahog.	1
I	¾"	1¾"	46"	Hond. mahog.	1
J	¾"	3¼"	18¾"	Hond. mahog.	2
K	¾"	3"	46"	Hond. mahog.	1
L	¾"	1¼"	46"	Hond. mahog.	1
M	¼"	1 1/64"	13"	Hond. mahog.	22
N*	¼"	½"	15/16"	Hond. mahog.	46
O	¾"	2¼"	44"	Hond. mahog.	2
P	¾"	2¼"	48½"	Hond. mahog.	6

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

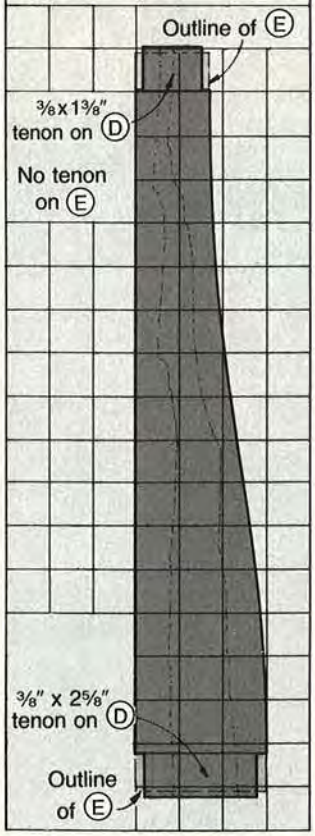
Supplies: #8x1¼" F.H. wood screws, white glue, woodworker's glue or epoxy, clear polyurethane or white urethane

REAR LEG (Left rear leg shown)

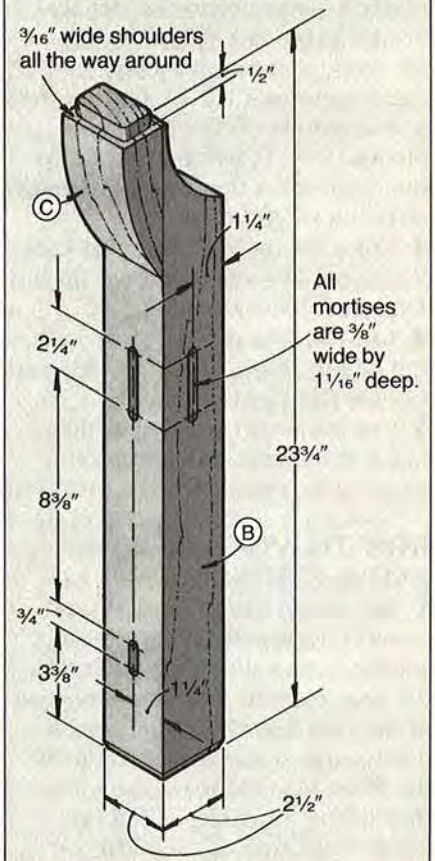


SIDE AND CENTER RAIL GRID

Each square = 1"



FRONT LEG (Right front leg shown)



Continued

other.) Mark all the mortise center points on each pair before drilling to ensure that you mortise the correct edges of each leg.

2 Form the mortises, following the multi-step sequence outlined in the Mortise-Forming Detail on the previous page.

CUTTING AND TENONING THE OTHER FRAME MEMBERS

1 Cut the side rails (D), center rail (E), and lower rails (F) to the sizes listed in the Bill of Materials. Cut the stretcher (G) to size plus 1" in length. Cut the seat rails (H, I), armrests (J), backrest top (K), and the backrest bottom (L) to size. (Do not make the contour cuts on D, E, and J yet; you'll cut them to shape after tenoning.)

2 Cut tenons on both ends of the side rails (D), lower rails (F), seat rails (H, I), the back end of the armrests (J), and both ends of the backrest top and bottom (K, L). Refer to the Side and Center Rail Grid for the tenon sizes on the side rails (D). See the Armrest Drawing for the tenon size on the armrest, and refer to the details on the Exploded-View Drawing for tenon sizes on the backrest top and bottom (K, L). Cut the rest of the tenons on the remaining pieces (F, H, I) using the shoulder dimensions on the Tenon Forming Drawing *at right.*

3 Cut a ¾" dado ⅜" deep in each lower rail (F) where shown on the Exploded-View Drawing.

4 Cut the side rails (D) and center rail (E) to shape using the Side and Center Rail Grid as a guide.

5 Cut the armrests to final shape using the Armrest Drawing on page 70 as a guide.

HOW TO ASSEMBLE THE END SECTIONS

1 Dry-clamp the legs (A, B) and rails (D, F) together. Square each assembly, and slide the tenon on the armrest into its mating mortise in the rear leg. Hold the armrest firmly against the tenoned top of the front leg, and mark the location of the mortise needed on the bottom side of each armrest. Remove the armrest.

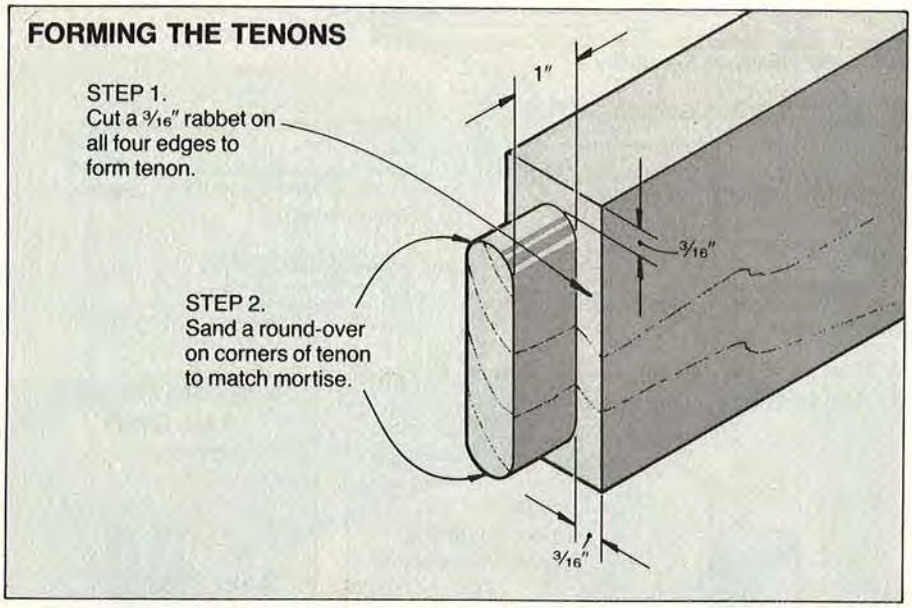
2 To form the mortise on the *bottom* side of each armrest, use a flat-bottomed bit, and drill a ½"-deep hole at each corner of your layout lines. Now, drill overlapping holes to remove stock and finally, chisel the mortise clean.

3 Check the fit of the end sections again with the armrests in position. Now, glue and clamp the end sections together, checking both for square. Position, but DO NOT glue the armrests to their mating parts at this point. You'll do this later, after the seat slats have been attached.

NOW, COMPLETE THE FRAME AND BUILD THE BACKREST

1 Dry-clamp the seat rails (H, I) and backrest top and bottom (K, L) between the end assemblies and check for square. Measure the distance between the dadoes in the lower rails (F), and cut the stretcher (G) to fit. Remove the clamps and disassemble.

2 Using the Backrest Top Rail Detail on the Exploded-View Drawing as a guide, cut or rout a ¼" groove ⅜" deep centered along the bottom edge of the backrest top rail (K) and along



the top edge of the bottom rail (L). (We cut ours on the table saw fitted with a ¼" dado blade. We also used a feather board to keep the pieces firmly against the fence when dadoing.)

3 Rip 11 strips 1 1/64" wide by 13" long from ¾" mahogany stock. Now, resaw each strip to obtain two ¼ x 1 1/64" wide strips for the splats (M). (We inserted the backrest top and bottom rails into their mating mortises and measured the length needed for the splats.) To form the spacers (N), start by cutting two strips ¼ x ½ x 30" long. Rout or sand a ⅛" round-over along one edge of each long strip. Now, set a stop and cut the spacers (plus a few extra) to length (15/16").

4 Measure and mark the lengthwise- center of the backrest top rail (K) and the center of one spacer (N). As shown in photo A, position the marked spacer in the groove, and align its center mark with the centerline on the backrest top rail. Working from the center out, glue and clamp the splats and spacers in position, checking *each* splat for square. If the spacers on each end extend past the groove, trim them to length.

5 Once you have glued all the spacers and splats in position in the backrest top rail, clamp a scrap strip on each side of the splats to align them as shown in photo B. Now, run a bead of glue down the groove in the backrest bottom rail, and tap this part onto the ends of the splats as shown in the photo. As soon as all the splats are positioned in the groove in the bottom rail, flip the assembly over to keep the glue in the groove from running down the splats. Wipe off any excess glue with a wet rag immediately.

6 Again, starting at the center, glue the spacers in position, trimming the end spacers if they protrude. Check the fit of the backrest assembly (K, L, M, N) into the mortises in the rear legs. Separate the backrest assembly from the rear legs.

7 Rout a ⅜" round-over along the top edges of the backrest top rail (K). Then, mark and cut a ½" radius on each top corner of the backrest top rail. Sand each radius smooth with a ½" drum sander.

BULDING THE SEAT

1 Glue and clamp the seat rails (H, I) and the backrest assembly between the end sections, checking for square.

2 Clamp the center rail (E) between the seat rails, centered from end to end. Cut four triangular-shaped glue blocks to the size stated on the Exploded-View Drawing. One at a time, hold a glue block in position against the center rail, and drill 7/64" pilot holes and 5/32" shank holes. Finally, glue and screw the glue blocks to the framework to hold the center rail in position.

3 Cut the seat slats (O, P) to size. Rout a 3/16" round-over along the top edges of each. Cut several strips of scrap wood ¼" wide for use as spacers. Clamp the front slat (O) to the bench flush with the front edge of the front legs (B). Now, work toward the back, spacing the slats ¼" apart with the scrap spacers.

4 Once all the slats are clamped in position, drill plug, shank, and pilot holes to the sizes indicated in the Mounting-Hole Detail on the Exploded-View Drawing.

5 Again, starting with the front slat, remove the clamps, and glue and screw the front slat to the bench framework. Proceed toward the back, one slat at a time.

6 Plane a piece of mahogany to a 5/16" thickness and cut thirty two ⅜"-diameter plugs from it. Plug the screw holes and sand the plugs flush.

7 Glue and clamp the armrests (J) in position.

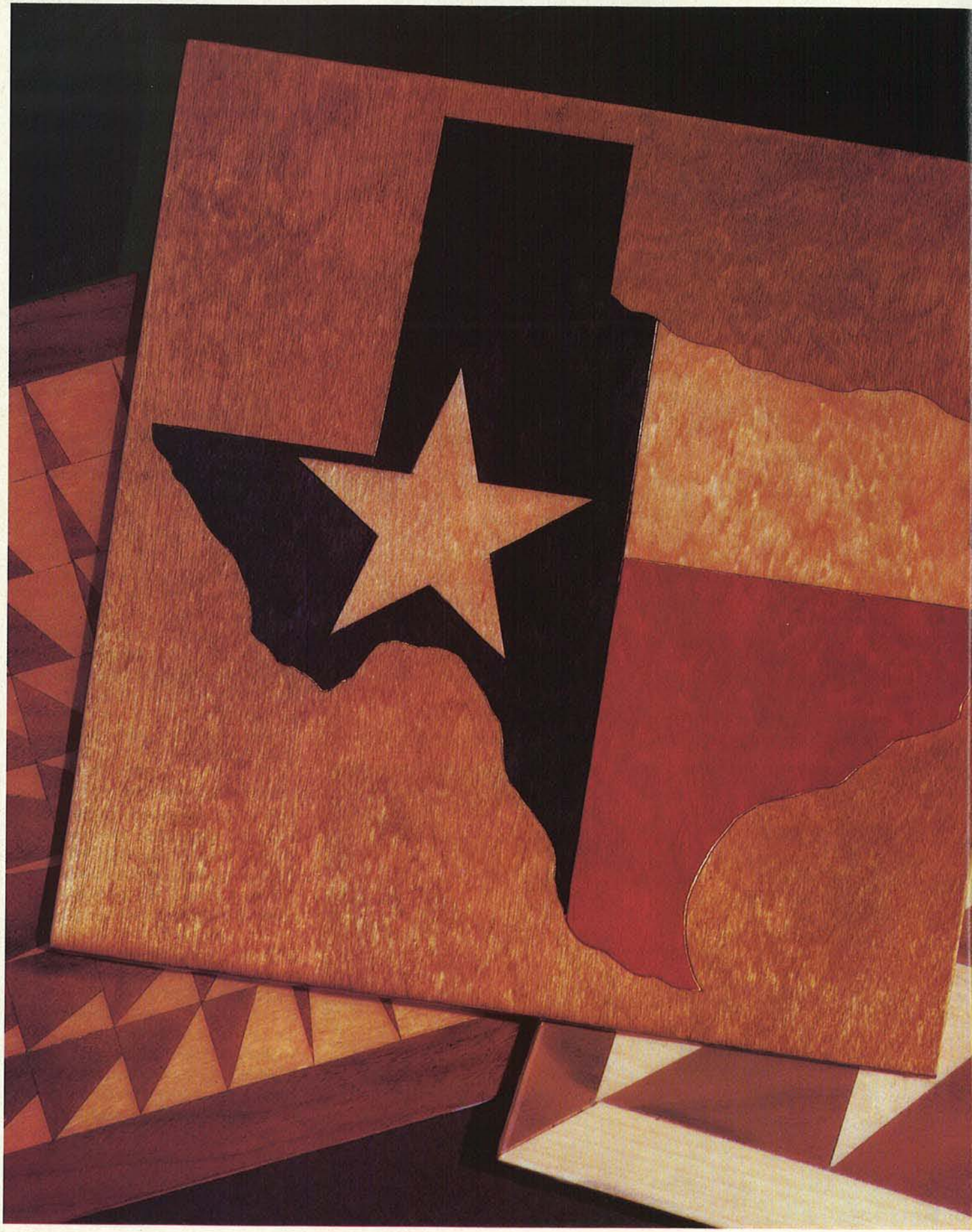
FINISHING UP

1 Sand the settee smooth. Stain and finish as desired. (For indoor use, we finished the settee with clear polyurethane and no stain. For outdoor use, we applied two coats of white exterior urethane.)

BUYING GUIDE

- **Mahogany turning squares.** 3 x 3 x 24", unsurfaced, catalog no. W2355, $9.35 each (two needed). 3 x 3 x 36", unsurfaced, catalog no. W2375, $15.46 each (two needed). 3 x 3 x 18", unsurfaced, catalog no. W2345, $7.07 (one needed). Craftsman Wood Service, 1735 W. Cortland Ct., Addison, IL 60101, or call 312/629-3100.

Project Design: James R. Downing
Photographs: Bob Calmer
Illustrations: Kim Downing; Bill Zaun



MAKING HIS MARK IN Marquetry

Print this article

John Wilson brings a contemporary style and technique to this centuries-old art. When you find out how he does it, you'll want to give it a try, too!

Way back in high school John Wilson's art teacher predicted that he would become a designer. Admittedly a class cutup at the time, John wasn't quite sure what that meant. Yet, he eventually graduated from a top design school.

Now John makes a living seeing things others don't. He looks for another way to build or do something, and never accepts what is for what could be. His list of patents attests to that high school teacher's accurate insight. He has designed such diverse commercial products as an open face spinning reel, a personal computer cabinet, and ultra-sound equipment for use in sports medicine.

Just for the heck of it, John designs and redesigns some pretty commonplace items, too. You'll find the evidence around his workshop: a miterless picture frame, an all-wood veneer roller that won't scratch, and a taller-than-average shoe shine box for portly people who can't stoop. You see, even at leisure, John never quits designing. "Some problem will catch his attention and he'll chew on it and chew on it," says his wife, "until he gets it out of his system."

Usually John gets it "out of his system" by sketching an idea on his drawing board. If the idea shows promise, he'll take it to the workshop. "Normally," John explains, "I'll spend two-thirds of the time designing, and one-third building a project. Most of what I make has some rhyme or reason. If there's no problem, it's not interesting to do." And that, exactly, was how John got into marquetry.

Bringing marquetry into the 20th century

"Why can't letters and numbers be drawn solid? Why, for instance, does an 'O' have to look like a doughnut?" Believe it or not, that's what was going through John's head a few years back when he decided to work out this problem in wood veneers. The piece of marquetry displaying his solution (next page), proves that solid numbers and letters can indeed be leg-

John Wilson, 56, shown at his drawing board, *left*, gets paid to be creative. As an industrial designer, he designs products for companies. John not only makes things look better, he often designs them so they're simpler to make. That's what he does with his marquetry, but just for fun, as with his salute to the Lone Star state and the "20th-century" designs shown *opposite*.

After visiting with John and Jan, his wife, in their Tulsa, Oklahoma home, we realized John's creativity has few bounds. Their living room boasts his paintings. His woodworking shop has drawings for everything from puzzles to slingshots. To John, his workshop represents recreation — a place to work his mind not take his mind off his work!

Continued

ible. And, he discovered, they're also much easier to cut out!

The way it works with John, one thing leads to another, and he began designing other marquetry projects. He saw no reason why marquetry had to be done in what he calls "traditional" designs.

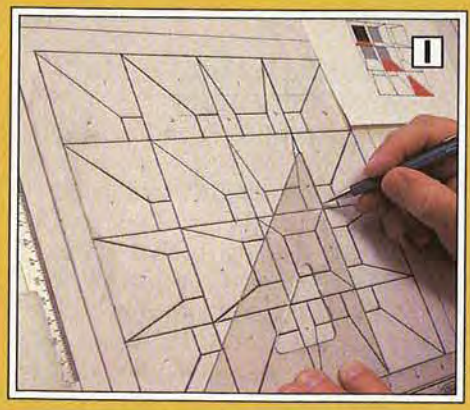
"I don't like the pretty fields and streams and other scenics of most marquetry," he says, "so I started drawing bold, geometric designs. For me, this was bringing marquetry into the 20th century. I even thought about selling the designs, because they're easy to do."

By using techniques nearly as untraditional as his designs, John eliminated tools such as fret and veneer saws, edge trimmers, clamps, and veneer hammers. He's also done away with any edge-beveling of individual pieces, and relies primarily on a metal combination square, a metal ruler, an X-acto knife with No. 11 blades, and a pencil. For his brand of marquetry, these tools match the material perfectly.

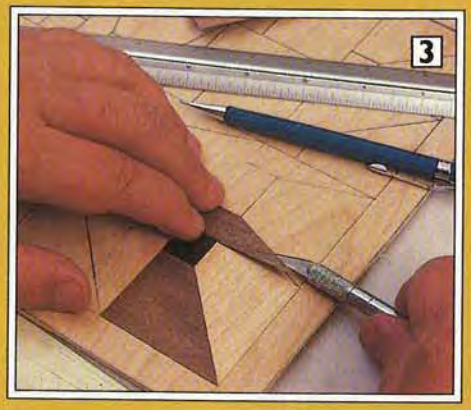
"I prefer the new flexible veneers over the thicker, more rigid types, "John notes. "Flexible veneers are about 1/64" thick, and have a thin paper backing. They're more expensive than heavier, 1/28- or 1/40"-thick veneers, but they won't chip as easily, either. And, these thin veneers cut clean with little effort using an X-acto."

To prove that letters and numbers could be made solid, John designed this marquetry pattern. "They're easier to cut out that way, too," he claims.

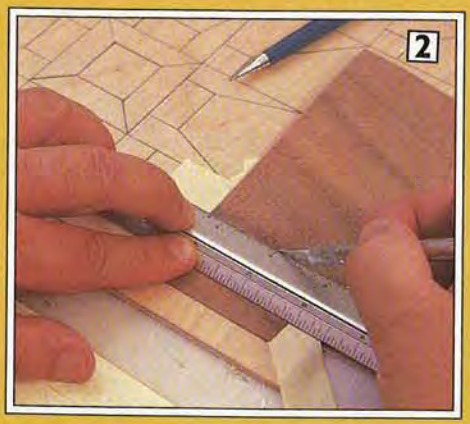
EASY AS ONE, TWO, THREE...



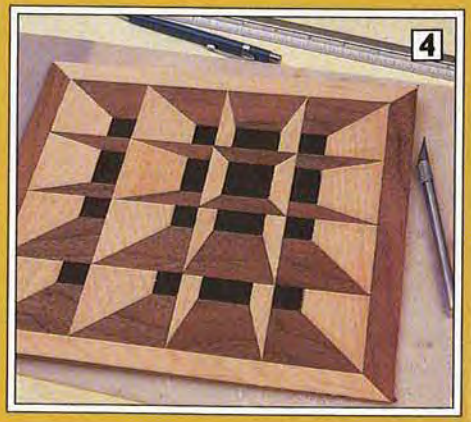
1. After hours of working on a tiny thumbnail sketch, John redraws the final design, full-size, on acetate.



2. Masking tape laid down on the pattern helps John follow the lines in cutting the corner, and starter piece of veneer.



3. After he cuts and fits a piece, John glues it down with rubber cement. The left edge of the pieces create a straight line to square other pieces against.



4. Completed, the marquetry will be pressed, then finished with polyurethane. Many of John's patterns are drawn in perspective to make them look three-dimensional.

From tiny sketches full-size patterns grow

Sometimes, John draws 10 or more tiny sketches, called "thumbnails", before a design evolves to the point where he wants to try it in wood. Then, he makes a full-scale drawing of the marquetry pattern, as shown in photo 1.

Next, he'll transfer his pattern directly to the wood on which he'll lay the veneers. "You can buy regular backing board from veneer suppliers, but it's a dark brown color and the layout lines don't show up well enough. So, I use a plain old 10 × 10 × ⅛" piece of sanded AB plywood," John says.

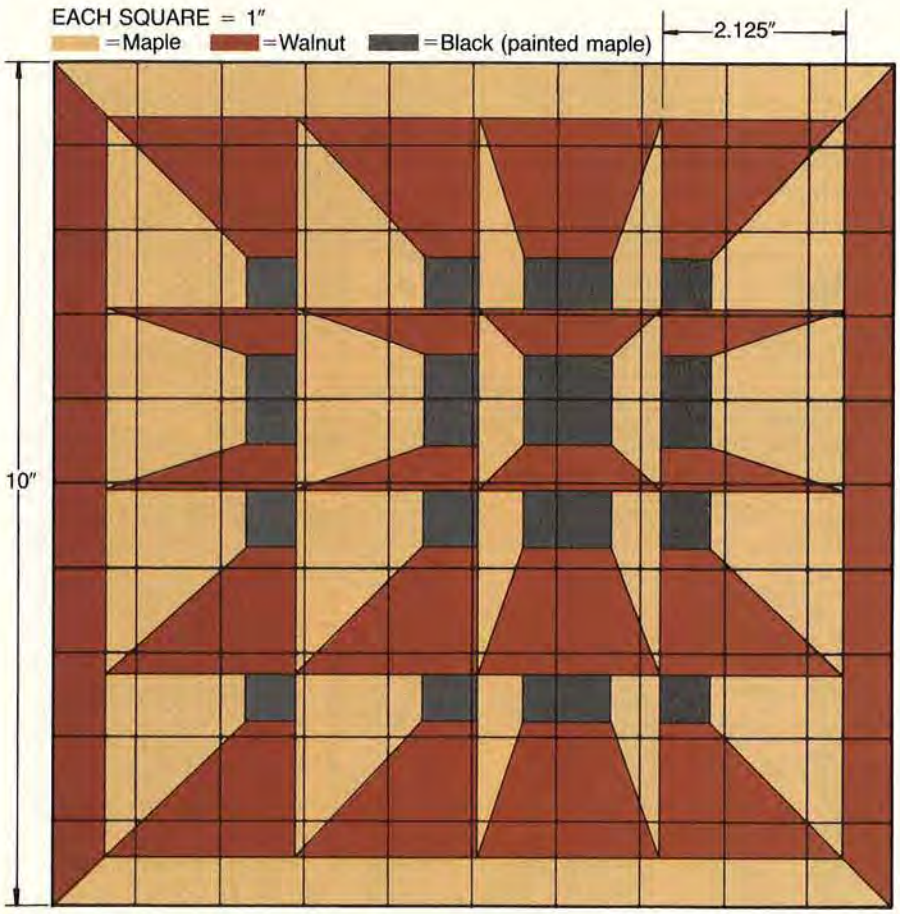
The trim and fit of marquetry

Unlike most aspects of woodworking, marquetry requires little space and creates little mess. You can do it practically anywhere. John often works at the desk in his home.

To make the geometric pattern shown *below,* he uses one square foot each of walnut and maple flexible veneer. The maple serves as the light-colored wood *and* as the black — he stains it with watercolors to obtain black.

John glues down the cut veneers with rubber cement. "That way I can work the pieces over and over until they fit perfectly," he advises. "When it's finished, a heavy coat of polyurethane over the top keeps them from coming unglued." But if he were going to use the marquetry for a tabletop inlay rather than a plaque, John would use contact cement.

John always begins his geometric patterns by cutting and gluing down a corner piece, as he's doing in photo 2. That way, his second piece will have a veneer edge to square up against. The masking tape laid along the pattern lines helps guide his rule and knife.



"Be sure to cut all the pieces of each type of veneer so that when you lay them down, the grain all runs in the same direction," warns John. "Otherwise, alternating grain really distracts the eye. And, when you make a cut," he continues, "always pull the knife toward you because it's easier to control. Turn your workpiece around if you have to rather than cut away from yourself."

Continuing on the pattern, John lays down pieces along one of his vertical pencil lines in order to keep them straight. In photo 3, he's laying down a piece of walnut against one of "black" maple.

To complete the plaque, photo 4, he adds a border of contrasting veneers on the face. John warns that the completed piece may warp a bit by the time the last piece goes down. To flatten it while the glue dries, he presses the board overnight between the desktop and a piece of ¾" plywood with a weight on top.

For a finish, John "floods on" polyurethane varnish rather than brushing it. To do this, he first heats the varnish on a hot plate. "This changes the urethane's viscosity so the little air bubbles escape," he says. John pours the warm finish directly onto the middle of his plaque, and it spreads evenly over the marquetry.

Because the plywood backing board is so thin, John says, he rarely attempts to band or conceal it. Although his work could be framed, John prefers to have it stand alone. Any boxing might detract from its illusional three dimensions. And to John's designing eye, 20th-century work should be able to stand alone.

Why not try your hand at marquetry? Just follow the same step-by-step process John does, and use the same materials for the eye-catching piece shown in the pattern at left.

Written by Emily Freeman Pinkston
Photographs: Bob Hawks
Drawing by Bill Zaun
Designs: John T. Wilson

CARVE FRENCH LOUIE

AN ADIRONDACK MOUNTAIN HERMIT BY RICK BUTZ

One in a collection of regional patterns from the nation's top carvers

Print this article

Rick Butz

Rick and Ellen Butz live on a mountainside near Blue Mountain Lake, New York. In their Adirondack mountain setting, they make their living carving birds, animals, and figures of the area. Rick, shown above at his workbench, has also authored books on woodcarving and teaches it in a PBS television series "Woodcarving with Rick Butz."

Rick finds the source for many of his figures in old photographs. One of his favorite characters to carve happens to be the legendary hermit, French Louie.

According to Rick, French Louie lived in the 1800s. Although his home was a solitary one deep in the forest, French Louie occasionally guided hunting parties to earn a few dollars for supplies. When he got paid, French Louie went on notorious sprees, buying drinks for the whole town. Then, he'd shoulder his sacks of flour and disappear into the woods.

Rick's characterization of French Louie, complete with Adirondack pack basket and ax, stands about 6" tall. The transparent colors suggest the hermit's rough, faded clothes.

Tips on carving French Louie

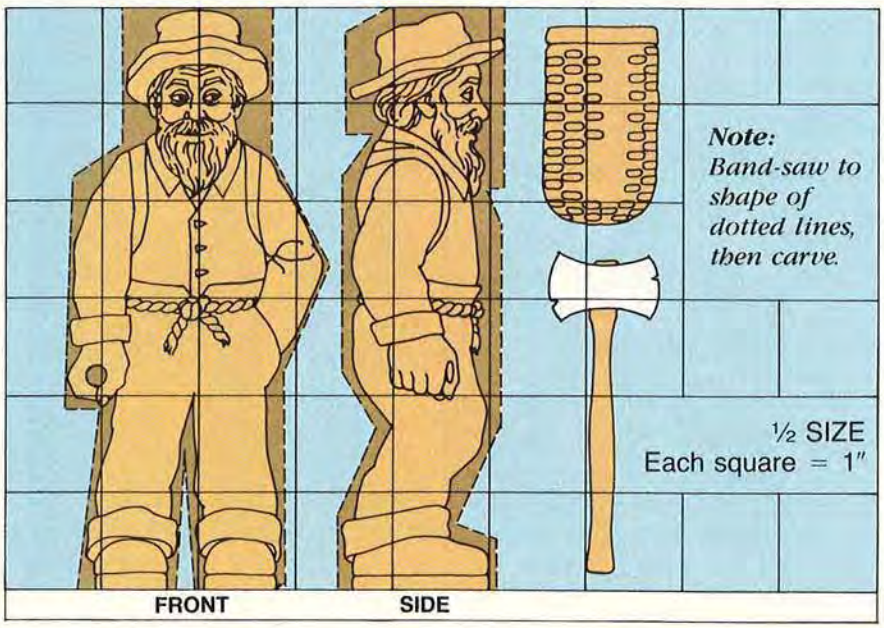
Rick likes to carve air-dried, eastern white pine. But you can use your favorite carving wood for French Louie, as long as it holds detail and takes paint.

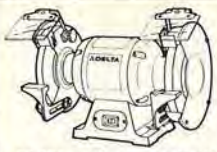
About the only tricky part of this carving you'll find will be the hat brim. Says Rick: "You'll be working with a thin — about 1/8" thick — section of cross-grain wood, and too much pressure will break it. To avoid the problem, Rick advises you "shape the hat's crown and upper brim first. Then, use a coping saw to cut around underneath the brim to a 5/16" depth. After that, it's fairly easy to carve away the excess around the head and leave the hat brim intact."

If you want to finish your carving the way Rick does, thin artist's oil colors with turpentine to the consistency of stain. "This gives your carving a soft, transparent color that still allows the grain to show through," Rick notes. "After the paint dries, apply a thin coat of paste wax, then buff it for a mellow, burnished finish."

Note: For a full-size pattern of French Louie, send a self-addressed, stamped envelope to: CARVING PATTERN, WOOD Magazine, Locust at 17th St., Des Moines, IA 50336.

Design and photograph: Rick Butz





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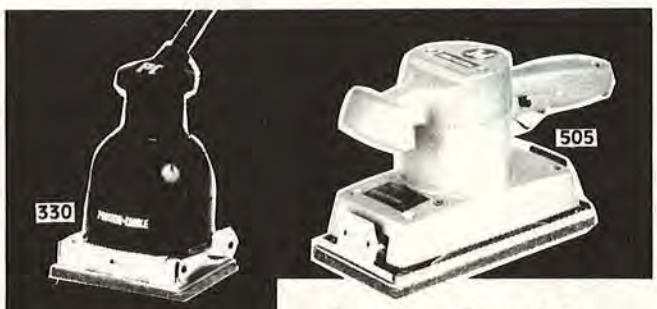

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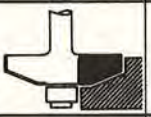	#15	RAISED PANEL	20° Angle	1-5/8"	1/2"	25.00
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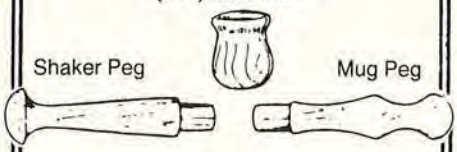

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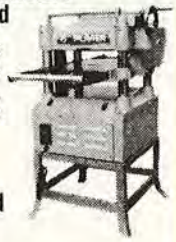

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PIN ROUTING ATTACHMENT

Continued from page 39

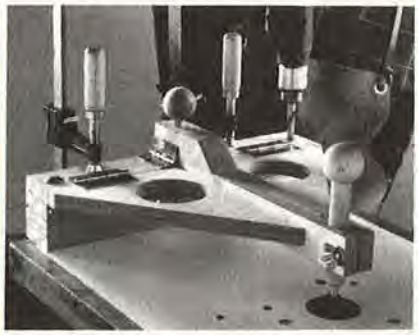
hinge holes in the top support slightly off-center toward the back to ensure a snug fit.) Trim the wing ends flush with the ends of the top support.

2 Position the hold-down on the top support, align it with the arm, and clamp it into place. Drill mounting holes and hinge the hold-down to the top support firmly against the back edge of the arm.

3 Place the alignment pin into the ¾" hole in the arm. Epoxy a ¼ x 2" carriage bolt in the ¼" hole at the kerfed end of the arm, and attach a flat washer and wing nut to the bolt to hold it secure until the epoxy dries. Finish the pin router as desired. (We disassembled the parts, masked off the hinges, and applied polyurethane to the supports, wing assembly, and pins.)

4 Raise your table-mounted router so the collet protrudes slightly above the surface of the table. Position the pin-routing attachment (with a couple of spacers beneath it) so the alignment pin fits into the collet as shown in the photo *below*. Clamp the pin router to the router table. Using the holes in the spacers as guides, drill two ⅜" holes through the router table. Fasten the routing attachment to the router table with carriage bolts.

***Note:** For an in-depth look at using the pin routing attachment, see the "Template Routing" article starting on page 32.*



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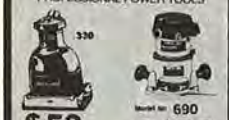

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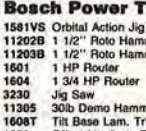

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ASK WOOD

Print this article

Whether your woodworker's license reads "Beginner", "Intermediate", or "Advanced", you're bound to have a few questions about your favorite hobby. We can help. Each issue, we'll consult our experts for answers to your most-asked questions. Send your questions to:

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Due to the volume of mail, we can't promise to answer all questions, but we'll try! Letters selected for use will be edited for publication.

GETTING RID OF "TINY LIVESTOCK"

Q. *From time to time I get hollow sections of trees that are quite beautiful when cleaned, carved, and finished. Unfortunately, these wood sections often come complete with post beetles or similar insects. I have tried to kill the insects, but they just seem to multiply. Can you tell me an easy, economical way to kill the pests so I can bring the wood into my house?*

— Harold W. Felton, Deltaville, Va.

A. Harold, we checked with Dave Foster, Extension entomologist at Iowa State University about your problem. He offers these suggestions:

1. During the summer, wrap the wood in a plastic bag and place it in a freezer for a week or two. This should kill the insects as long as they haven't had any gradual cold conditioning. Or, you can heat the wood in an oven to a temperature of about 160 degrees for several hours. But monitor temperature so it doesn't get too hot and char the wood. This process will, however, dry out the wood and possibly render it unacceptable for your use.

2. To kill the insects chemically, Foster suggests buying a vapona strip (Shell No-Pest is one commercial brand). Place the wood in a plastic trash container and hang the vapona strip inside the container. Then, replace the cover and seal the container with duct tape. Let the sealed container of wood set for a month or two. This should do a pretty fair job if the insect tunnels are open so the chemical vapors can penetrate to where the insects harbor. You may want to consider becoming a certified pesticide applicator. This would allow you to treat the wood with certain effective, but restricted, pesticides. For information, contact the Cooperative Extension Service office in your county, or a chemical dealer.

As an alternative, contact a commercial pest control firm. Ask about the possibilities of small-scale fumigating to control the tiny livestock in your wood pieces.

Continued on page 84

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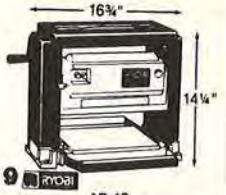

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ASK WOOD

Continued from page 82

HELP IN CHOOSING CIRCULAR SAW BLADES

Q. *Can you give me a rundown on saw blades? I would like to know, for example, what type of blade would be best for general cutting, or which ones work well for cross-cutting and ripping.*

— Leonard Caton, Boulder, Colo.

A. Leonard, start by hanging the blade that comes with a new saw on the shop wall. Use it only when you have rough cutting to do.

Now, you've got a decision to make. You can select a separate blade for ripping, another for crosscutting, and additional speciality blades as needed. Or, you can buy a combination blade designed for both ripping and crosscutting. A good one should handle most, if not all, of your basic cutting needs.

RIP BLADE

COMBINATION BLADE

Some woodworkers prefer blades with carbide tips. Although they cost more initially, the carbide teeth stay sharp many times longer than standard steel blades.

There's no hard and fast rule on tooth numbers. Generally, for a 10" diameter blade, look for about 24 to 30 teeth in a rip blade. In some cases, a 12-tooth blade may work well and put less load on the saw. Consider 40 to 60 teeth for general crosscutting chores. Special plywood or veneer blades will have even more teeth. Slots cut into blades allow for expansion when they heat up. This helps reduce warping, heat distortion, and "walking" during cutting.

Most blades can be used interchangeably on radial arm and table saws. However, avoid rip blades with high tooth angle (30°) on a radial arm saw. Blades with high tooth angles tend to cause more lifting of the work piece off the table when cutting. This increases the chances of the work kicking back toward you when ripping.

BLADE DOESN'T STAY IN POSITION

Q. *I have a Craftsman 10" table saw, model # 113.295702. When I use my 7" adjustable dado blade on it, I set the proper blade height at the start. But before I get through the job, the cutting height will be lower. What's causing the problem?*

— Russell Simpson, Winston Salem, NC

A. Russell, we shared your letter with our project builder, Jim Boelling. He suspects your problem may be caused by wear or sloppy fitting between the

Continued on page 86

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ASK WOOD

Continued from page 84

machine threads on the elevation shaft and the threaded hole-pin assembly in the trunnion supporting the arbor. If these parts fit somewhat loosely, vibration of these parts during operation may allow the arbor and blade to fall. New saws may also have this problem if the parts haven't been machined within tolerance. Any play, however minimal, may be enough to cause this kind of problem.

To minimize the problem Jim suggests you try these tips:

1. Always lower the blade first, then raise it to cutting height. This keeps positive weight on the machine threads and reduces the likelihood of the saw dropping during use.

2. If the saw has a locking knob in the center, or outside of the hand wheel, tighten it securely after you've done step 1.

If these steps fail, take the saw to a reputable service center and find out what parts need to be replaced.

POPULAR PUZZLE BLOCK

Q. *I made the puzzle block shown on page 46 of your February 1987 issue. I liked it so well that I made several for Christmas gifts. The gifts were so well received by my friends that I wonder, would there be any problem if I made more and sold them? Would the same apply to other projects shown in past or future issues?*

— Earl W. Beers, Meriden, Conn.

A. Earl, we're delighted you and your friends enjoy the puzzle block. Please feel free to make, give away, or sell as many projects from WOOD magazine as you like.

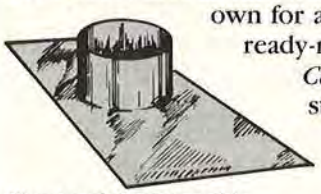
Our copyright does prohibit copying or republishing of the material, including project plans, in other publications.

Illustrations: Jim Stevenson

SHOP SENSE

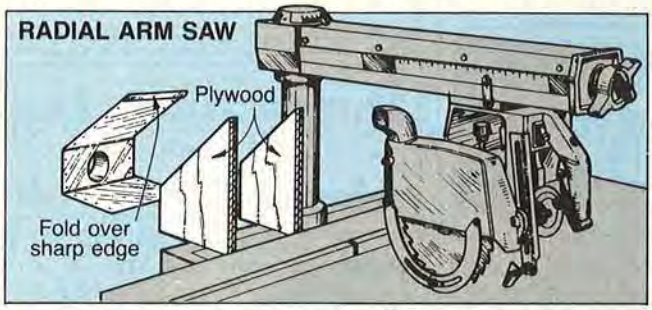
MAKE YOUR OWN HOODS TO COLLECT DUST

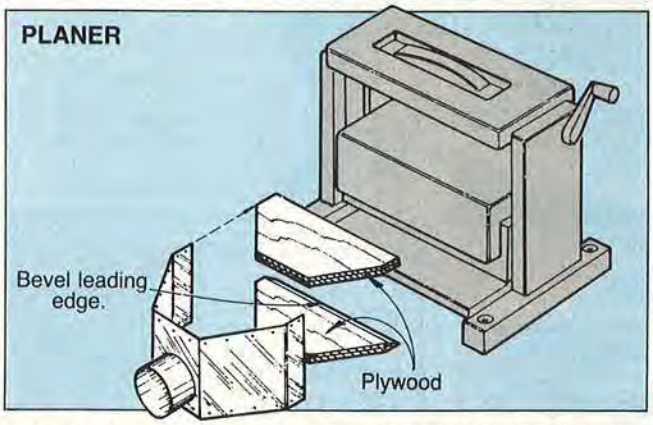
If you have newer power tools, they may already have dust collection hoods attached. If they don't, you can buy original equipment hoods for many power tools from their manufacturers. Companies and dealers selling dust collectors also have ready-made hoods of heavy-duty plastic or sheet metal available with 4", 5", or 6" collars. You can adapt these to fit radial arm saws, table saws, and other tools. They'll cost anywhere from $40 to $80. Multipurpose fittings, called *straight hoods* and *side hoods*, cost about $30. You also can make your own for about half the price of ready-mades.



Sheet metal catcher strip with attached collar

Catcher strips, made from a strip of sheet metal with a collar attached to match your duct work, enable you to make your own custom hood. You simply cut the sides of your hood from plywood to the shape you need and attach the catcher strip to the edges. Then, seal the joints air-tight with caulk or silicone and you're in business!





A sheet metal shop can assemble catcher strips for you. Or, order them from Murphy-Rogers, Inc., 2301 Belgrave Ave., Huntington Park, CA 90255. Their strips measure 9x36", cost $14, and have either 4", 5", or 6" collars to fit your ductwork. For details, call 213/587-4118.

Illustrations: Bill Zaun

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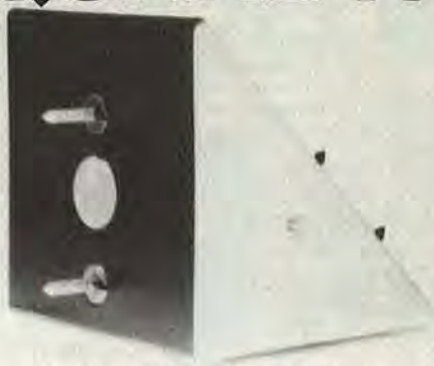

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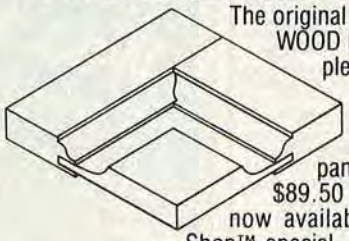

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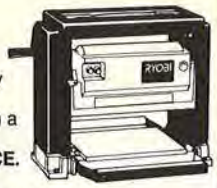

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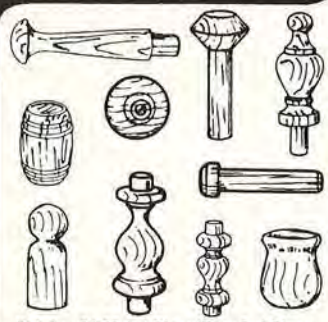

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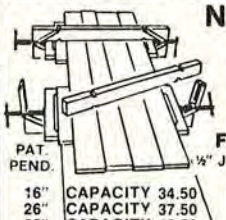

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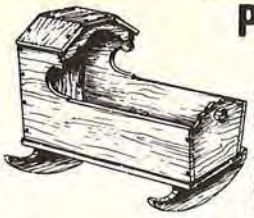

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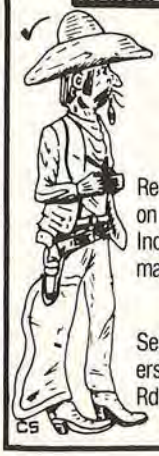

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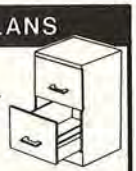

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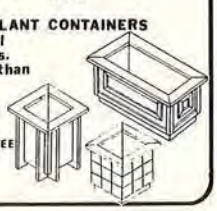

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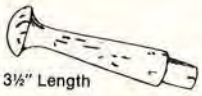

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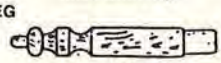

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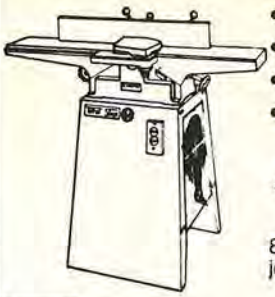

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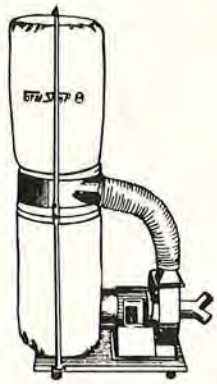

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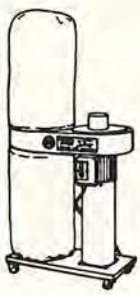

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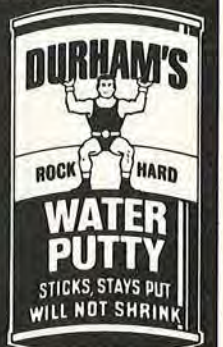

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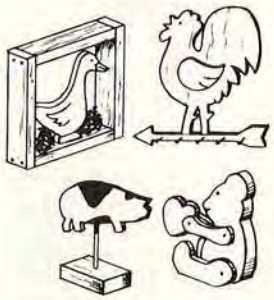

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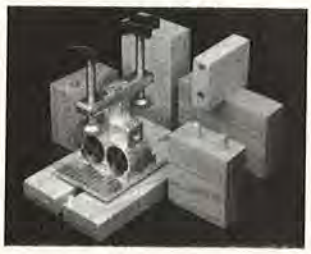

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☐ Give dad the best from England. This genuine Record woodworker's vise features a quick release lever, front dog and accurate machined housing. With a jaw width of 7" and jaw opening of 9", ample clearance is provided for gripping large work. #300-0600 woodworker's vise $49 from FINE TOOL SHOPS INC., Dept. WM67, 170 West Rd., P.O. Box 7091, Portsmouth. NH 03801.

☐ Personalize your wood items quickly and easily with this brass branding iron. First line: HAND CRAFTED BY; second line: your choice of up to 20 characters including spaces. Compact size. $28 ppd. Guaranteed. Order toll-free 1-800-826-7606 (NE residents call 402-464-0511) or by mail from NOVA TOOL CO., P.O. Box 29341, Dept. BGL, Lincoln, NE 68529. Shipped within 1 week.

☐ Carving tool kit: Give dad a quality Warren Tool Kit #KBL3-W. Includes a walnut and brass interchangeable handle and three high carbon steel blades honed ready for use. Send $20.40 ppd. for the kit or $1 for a catalog and let dad choose from over 500 items; money-back guarantee. WARREN TOOL CO., INC., Rt. 1, Box 14-A, Rhinebeck, NY 12572; UPS/COD call 914-876-7817.

☐ These dinosaur kits make great gifts for young and old alike. Die-cut of gum plywood, they assemble like a jigsaw puzzle. They are packaged in colorful cartons which describe these prehistoric giants. The spinosaurus (shown) is 20" long. Price is $8.50 ppd. Buy three (all different) for $22.50 ppd. ARMOR PRODUCTS, Box 445, East Northport, NY 11731; 516-462-6228.

☐ Now you can lay out precise letters and numbers for your wood craft projects. Scrollsawers and sign carvers use these specially designed lettering layout guide sets. Quick and easy-to-use—simply trace around the letters—guides are very durable. Several styles and different sizes are available. Brochure $1. SEYCO SALES, 2107 S. Garland Ave., P.O. Box 472749, Garland, TX 75047.

☐ Moisture-related problems such as shrinking, warping, cracking can ruin the most beautiful wooden pieces. Avoid wood moisture problems by checking the wood with a moisture meter! The pocket-size Mini-Ligno moisture meter is for the serious hobbyist and professional woodworker. For more information contact: LIGNOMAT, P.O. Box 30145, Portland, OR 97230; 800-227-2105, 503-257-8957.

☐ Executive wood toys! Now you can create this 1929 Ford showpiece and many others like it from our detailed and easy-to-read patterns. We offer you a complete line of patterns, parts and wheels. Make this holiday season a time to remember with one of our executive wood toys! Send $1 for catalog to: TOYS AND JOYS, Box 628 GL, Lynden, WA 98264.

☐ Cut intricate patterns in wood, plastics, light metals. Add your own ¼-hp electric motor to an Excalibur II, and start cutting! $495 U.S. delivered to your door. Includes 72 blades, wrenches and manual. Try it for 30 days and you must be satisfied, or purchase price refunded. In the U.S., call toll-free 1-800-387-9789, in Canada call collect 416-293-8624. J. PHILIP HUMFREY INTERNATIONAL, 3241 Kennedy Road, Unit 7, Scarborough, Ontario, M1V2J9.

☐ Drum sander attachment converts any radial arm saw to a surface thickness sander for finish sanding up to 44" wide; can be attached to standard stand kit. Hardware kit available. Allows precise dimensioning of boards and parallel edge jointing. PERFORMAX PRODUCTS INC., 17065 Judicial Rd., Dept. W5, Lakeville, MN 55044. Call 1-800-334-4910; in MN 1-612-435-6780.

☐ Solid 1⅜" hard maple hearts in several thicknesses for craft, decor and art work. 100 hearts ¼" thick $14 ppd. Also dowels, pegs, plugs. MIDWEST DOWEL WORKS, 4631 Hutchinson Rd., Cincinnati, OH 45248.

☐ Sand like a professional, quickly and beautifully. The B-12 brush head (top) sands mouldings and intricate carvings without losing detail or shape of the part. Model # DD-63 (bottom) gives quick and excellent results on contoured-shaped parts. Both industrial quality. SAND-RITE MANUFACTURING CO., 321 N. Justine St., Chicago, IL 60607; 312-997-2200.

☐ Receive *The Mallet* magazine each month for one year, a membership card for museum admissions, purchasing, exhibiting and publishing benefits PLUS *The Wedge Head* by Kent Bailey. Send your check or money order for $15 to: NATIONAL CARVERS MUSEUM, 14960 Woodcarver Rd., Monument, CO 80132, or use Visa or MC by calling 303-481-4737. This offer expires Sept. 30, 1987.

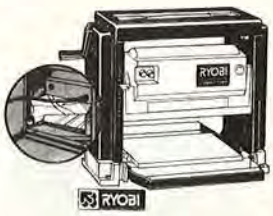
☐ Deburr, grind and polish holes, slots, grooves, curved and carved surfaces by hand with this versatile abrasive cord. It's great for hard-to-reach places. Cord is 75′ long, 120 grit, 5/64″ aluminum oxide. $9.25 plus $1.50 s/h. W.S. JENKS & SON, 1933 Montana Ave. NE, Washington, DC 20002; 1-800-638-6405.

☐ A compact, simple-to-operate unit for quick, convenient production of inflatable sanding drum sleeves and belts for belt sanders and grinders. Produce bump-free belts and sleeves superior to those commercially available, at lower cost, when and as you need them. SANDAID introductory kit includes: press, splicing adhesive, splicing tape, operating instructions, plans for jig $82.95. KUSTER MANUFACTURING, P.O. Box 34, Skillman, NJ 08558; 201-359-4680.

☐ This folding trim saw is ideal for the toolbox. 9″, 17tpi blade folds into the slotted wooden handle for protection when not in use. Overall open length 21″. $26.15 postpaid. GARRETT WADE CO., 161 6th Ave., New York, NY 10013; 1-800-221-2942.

☐ Give Signcraft for Father's Day. Signcraft puts your woodworking skills to work in a lucrative field—signmaking. Regular features include routing, carving, sandblasting and painting plus many other types of hand-produced signs. Send for free subscription information. SIGNCRAFT MAGAZINE, P.O. Box 06031, Ft. Myers, FL 33906.

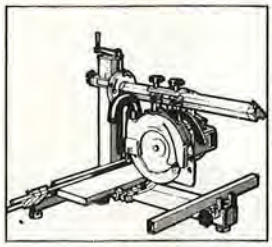
ZAC



☐ Square It™ fulfills the need of woodworkers to square any tool simply, quickly and accurately. Battery-operated, portable; perfect 90° and 45° settings on table and radial arm saws, jointer, drill press, band saw or any stationary machine. Square It™ and 17-page manual $76.50 ppd. The Door Shop™, carbide-tipped 1/4″ router bit set, complete with stile and rail, slot, panel raising bits and 37-page manual $89.50 ppd. ZAC PRODUCTS, 34 Renwick St., New York, NY 10013; 800-441-0101 or 212-645-9494.

☐ This is a must for that special Dad. The most accurate mat cutter and T-square for cutting perfect mats, both perpendicular and 45° beveled. 30″ long rule of light aluminum measures in both inches and centimeters. Only $22.95 + $4.00 s/h. CRAFTSMAN WOOD SERVICE CO., 1735 West Cortland Court, Addison, IL 60101.

☐ Emperor's bracket clock is a pleasure to build. Our craftsmen carefully cut each miter, mortise and tenon for a perfect fit. The solid brass movement is completely assembled and warranteed for three years. The movement strikes the hour and plays the Westminster chimes. The case is solid 3/4″ cherry sanded smooth and ready-to-assemble. For information write EMPEROR CLOCK COMPANY, Emperor Industrial Park, Dept. 2325, Fairhope, AL 36532.



☐ A truly unique tool, Inca's new radial arm saw rolls smoothly and adjusts precisely for all cuts. Four ball-bearing rollers give you amazingly smooth performance. The table turns for accuracy and the entire arm tilts to provide precise compound miters and bevel cuts. The saw pushes into your work rather than pulling for added safety. Cross miter, bevel, rip and groove with this unique machine. Options available: 28″ crosscut arm, router carriage and steel stand. HILLER HARDWARE, P.O. Box 1762, Columbia, SC 29202.

☐ Turn your radial arm or table saw into a precision disc sander with Gator Hyde 10″ sanding disc. Heavy-duty steel disc mounts easily to saw. Replaceable medium grit disc on one side, fine grit on reverse side. 5/8″ mounting bore. Now you can afford the luxury of a disc sander without the cost of an expensive machine. Send check or money order for $19.95 to: AMERICAN GATOR TOOL CORP., P.O. Box 395, Augusta, MI 49012-0395. Or call 616-731-4177 for a UPS, COD order.

HARDWOODS OF ILLINOIS

☐ Thin hardwood priced right. Clear, kiln-dried, two sides surfaced. 3″ to 10″ widths, 3′ to 6′ lengths. 20 sq. ft. packs, random widths and lengths. 1/2″ red oak $36 pkg.; 1/2″ walnut $44 pkg.; 1/2″ cherry $44 pkg.; 1/2″ pecan $29 pkg. 1/4″ and 3/8″ also available at same price. Prices include UPS delivery. Send check or MO with order. HARDWOODS OF ILLINOIS, RR4, Box 618, Mt. Vernon, IL 62864; 618-244-7221.

☐ The new Delta Universal Wet/Dry Grinder is a dual purpose tool that handles any sharpening job in the home workshop. 10″ wet wheel keeps hardened cutting tools cool when grinding to protect temper; 5″ dry wheel grinds almost anything that requires a precison-honed edge. Built to deliver long-lasting, smooth performance, the unit is backed by a two-year limited warranty on machine, parts and accessories. DELTA INTERNATIONAL MACHINERY CORP. For additional information call toll-free: 800-438-2486. In PA, 800-438-2487.

☐ Full-size wooden toy patterns—bulldozer, steam-shovel and roadgrader $6.75. Patterns plus hardwood turnings (wheels, axles, etc.) $14.50. Catalog of patterns, woodworking books and kits. Also carved wood—decoys, fruit, teddy bears and more plus other toymakers' accessories. Catalog free with order. Catalog alone $1.50. TOY DESIGNS, P.O. Box 441, Dept. BWF-587, Newton, IA 50208.

☐ This deluxe 14″ multi-speed wood lathe comes complete with a cast iron duplicator. Produce identical copies with the confidence of a pro! Heavy, cast iron construction assures stability and eliminates vibration. Built to give a lifetime of service. For complete information call 1-800-654-2254 or write to GREAT PLAINS MACHINERY CO., 4050 Broadway, Dept. 395, Kansas City, MO 64111.

☐ The Skil Twist® cordless power screwdriver is the perfect gift for Father's Day. It's as simple to use as an ordinary screwdriver but twice as fast. And its handy storage/recharging unit keeps it always ready to use. Under $25 at hardware stores and home centers everywhere.

☐ New Delta 10″ bench bandsaw. Straight cuts, resawing, curves and bevel cuts on material up to 3″ thick by 10″ wide. Table tilts 45°R for bevel cutting. Handy blade tensioning control. Single phase ⅓-hp motor. Two-year warranty. Only $139. ARONSON INDUSTRIAL SUPPLY, 5300 Denver Ave. S., P.O. Box 80987, Seattle, WA 98103. Call toll-free 1-800-243-5250; in WA 206-762-0700.

☐ Simply cut sandpaper from standard sheets for these sleeveless drum sanders. Father's Day special: 1″ × 3″ and 2½″ × 3″ set, $27 + $2.50 s/h. Many other sizes available. Money-back guarantee. Send check to SINGLEY SPECIALTY CO. INC., P.O. Box 5087B, Greensboro, NC 27403.

☐ RB Industries proudly produces the Hawk line of precision scroll saws—the largest line of scroll saws available anywhere. Models from 12″ to 26″ with the newest edition the SS-14, the first true precision scroll saw to fit multipurpose type tools. RBI, P.O. Box 369, Harrisonville, MO 64701; 1-800-535-8665.

☐ Like a third hand. Provides that extra support so often needed. Its rugged, heavy-duty, all-steel construction makes it a tool you'll depend on for years. Roller is 13″ long, galvanized and ball bearing. Adjusts in height from 25¾″ to 45″. When you're done, it folds flat. #HPR-13 $39.95 + UPS. HTC PRODUCTS, INC. Toll free 1-800-624-2027; (in Mich.) 313-399-6185.

☐ DML's 10″ Radi-All is the best and safest blade for radial arm saws. The specially engineered angle virtually eliminates overfeed and makes extremely smooth cuts through all wood. ⅝″ bore, C-4 carbide. #D 1060R only $59.95. WOODWORKS, 4013-A Clay Ave., Fort Worth, TX 76117; 817-281-4447. Visa/MC accepted.

☐ "Merle," the adjustable corner clamp, forces your project into square. Fully adjustable from 2⅝″ × 2⅝″ to 36″ × 36″. Perfect for anything that requires 90 degree corner clamping. Cast aluminum and steel construction; quick and easy to use. $18.95. MLCS LTD., P.O. Box 53-D, Rydal, PA 19046 or call toll-free 1-800-533-9298. (In PA 1-800-346-7511, ext. 56.) Visa/MC.

☐ Perfect edge-joining every time! Throw away your drill jigs and all other tools! New "Duo-Clamp" solves alignment problems, squeezes out excess glue, eliminates bowing. Made of sturdy maple. 16″ capacity $34.50, 26″ capacity $37.50, 36″ capacity $40.50 + $3 per clamp for s/h. Free information; phone 216-232-1281. MARK PRODUCTS, P.O. Box 46143, Bedford, OH 44146.

☐ If you value your fingers you need a RIPSTRATE®. Holds the work tight against the fence with no hands near the blade; makes perfect cuts; wheels lock to prevent kickbacks. No adjustment needed for stock width or thickness. One-year guarantee. $69 ppd. Check, M.O., Visa or MC. Free brochure. FISHER HILL PRODUCTS, 4 Fisher Hill, Fitzwilliam, NJ 03447; 800-421-0256.

☐ Buy this superb wooden block plane for about the same price that you pay for a high quality steel plane. Lightweight hornbeam body and super-tough lignum vitae soleplate. Craftsmen use one for fine planing, shaving end grains, etc. **Was $40; Father's Day special $35 ppd.** Catalog $1 (refunded with first order). HAMMERMARK ASSOCIATES, Box 201-GL, Floral Park, NY 11002.

☐ Wooden toy and craft plans. Full-size plans with photos and easy instructions. This classic Ford coupe includes spoke wheels, steering wheel and headlights for only $11.95 ppd. Plans only $5.50 ppd. Brochure free with your order. Brochure alone $1. FUNWOOD CRAFTS & TOYS, P.O. Box 541-XK, Coos Bay, OR 97420.

☐ At $115, the American Classic router from Porter Cable is more than a showpiece. Manufactured with exacting standards that professionals demand, this router has proven itself for over 25 years. Each comes with its own carrying case for easy portability. To order, write THE SOURCE, 7305 Boudinot Dr., Springfield, VA 22150, or call 800-452-9999 (in VA 800-468-1778).

☐ A set of six large angles: 15°, 12-sided cut; 18°, 10-sided cut; 22.5°, 8-sided cut; 30°, 6-sided cut; 45°, 4-sided cut and 60°, 3-sided cut. Also includes attaching bar for setting miter and bevel. Can also be used on boards cut by hand. Angles give a precision cut every time; more accurate than a bevel gauge. $29.95. ROBERT S. SMITH INC., P.O. Box 17330, Phoenix, AZ 85014.

☐ Kuempel chime clock kits are individually handcrafted by master craftsmen in solid walnut, cherry or oak. Choose tubular bell or rod movements with lyre pendulum and hand-painted moonwheel. Catalog $2. KUEMPEL CHIME CLOCK WORKS, 21195 Minnetonka Blvd., Excelsior, MN 55331-8605, 612-474-6177.

☐ DML's new "Challenger AD8000" dado adjusts easily and quickly to any width between ¼" and 13/16"; cuts smoothly, quietly and with less vibration. Twin 8"-diameter, 5/8"-bore 24-tooth carbide-tipped blades are joined at the center by an infinitely adjustable dial. For more information, call 800-233-7297.

☐ Bandsaw owners! A new tool is now available that lets you make or repair any length band saw blade in minutes! Our splicer is available in two models: 1C-001 for ½" to ¾" blades; 1C-002 for ⅛" to ⅜" blades; each $49.95 ppd. Complete with detailed instructions and 100 splices. NEW MILFORD SPECIALTIES CO., Dept. BHG, 24A South Main St., New Milford, CT 06776; 203-426-4276.

☐ Professionally designed project plans. Cutting boards, table lamps, furniture items and more. Send $2 for this idea-filled catalog and get $2 off your first order. THE WORKSHOP BLUEPRINT CO., P.O. Box 65725, West Des Moines, IA 50265.

☐ Freeborn offers the most comprehensive line of ¾" bore, T-bushed to ½", shaper cutters on the market today. These cutters are tipped in carbide or tantung. We also make custom cutters for your special needs. FREEBORN TOOL COMPANY. Call 1-800-523-8988 for the dealer nearest you.

☐ This Delta wet-dry grinder can handle almost every sharpening job. Slow speed 200 grit 10" wet wheel plus smaller 100 grit 5" wheel ideal for high-speed precision grinding. A ⅓-hp motor powers both wheels. Special price $139.95. WOODWORKER'S SUPPLY OF NEW MEXICO, 5604 Alameda Place N.E., Albuquerque, NM 87113 or call 1-800-645-9292; in NM 1-800-321-9841.

☐ Build this exact duplicate of an original Victorian piano stool from a kit! Smoothly sanded solid maple parts, cast-iron claw feet. Approximately 26 inches high. Some woodworking tools and skills required. Instructions/free catalog with order. $69.95 ppd. Order #S752. 1-800-843-3320. VAN DYKE'S, Dept. D55, Woonsocket, SD 57385.

☐ Makita 6070DW. This variable speed cordless drill weighs only 2.2 pounds. The built-in power pack recharges in three hours and comes complete with charger. List price $108. Yours now for only $58 from BEAVER TOOL & SUPPLY. Call us for all your power tool needs. Free catalog. Call toll-free 1-800-992-2877.

☐ Give Dad a musical project the whole family will enjoy. Build this Gothic harp from a pre-cut kit complete with top-quality hardwoods, decorative trim, hardware, strings and instructions. Fun to build, beautiful to play, excellent for harp teachers, students and performers. Kit price $399.95, finished value $1,000. ST. CROIX KITS, 423-B South Main, Stillwater, MN 55082. Catalog $1.

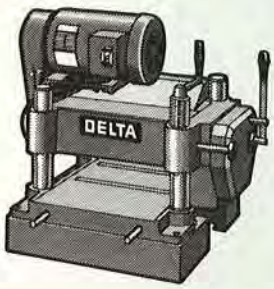
☐ Build a beautiful grandfather clock. From complete easy-to-assemble case kits like the F6SE above to plans and hard-to-find parts for the scratch builder, Murray Clock Craft features the famous URGOS German movements and only the finest North American black walnut, mahogany, cherry and white oak. Extensive selection of kits, plans, movements, parts and beveled glass available. Send $2 for catalog (refundable with first order) to: MURRAY CLOCK CRAFT LTD., 510 McNicoll Ave., Willowdale, Ont., Canada M2H 2E1.

SUPER 15″ SCROLL SAW

☐ Only $139.95 shipped complete, ready to run. Comparable value over $500. This versatile machine makes cutting intricate wood patterns easy. Thousands have been used in Europe for many years. PENN STATE INDUSTRIES-W, 2850 Comly Rd., Philadelphia, PA 19154; 215-676-7609, ext. 15.

☐ Edlco is offering a bundle for Father's Day. Ten board feet of ⅜″ shorts, 3″ and wider, 18″-36″ long in cherry, oak or walnut. Bargain priced bundle includes "how-to" project book *and* top-grade lumber catalog! $39.95 delivered. Offer good through June 15th only. Specify species; send check or money order to EDUCATIONAL LUMBER COMPANY, Box 5373 W, Asheville, NC 28813.

☐ Radial arm saw owners, now you can have a saw guide that is accurate, affordable and portable. Features stainless steel rule in inches by 1/16″ and metric by mm. and cm. Make single and repeat cuts with amazing accuracy for the small shop or the job site. $84.95 + $5.05 p/h. AZ-CAL PRODUCTS AND MANUFACTURING, 529 E. Juanita #2, P.O. Box 8429, Mesa, AZ 85204.



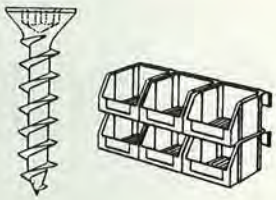
☐ A great gift idea for Dad—the RC-33 Delta 13″ planer. Includes table feed roll control, cast-iron construction, 2-hp motor. Now priced at only $949. Shipped prepaid to your door within continental U.S. Call for Mike 1-800-358-3096. ACME ELECTRIC TOOL CRIB OF THE NORTH.

Furniture Designs, Inc.

☐ Wonderland for woodworkers! Illustrations and descriptions of over 180 full-size plans of fine, museum-quality furniture. Includes cradles, roll-top desks, tables, chairs, buffets, chests, gun cabinets, poker table, children's furniture, rocking horse, spinning wheels and more. Send $2 for catalog (refundable with first plan order) to: 1827 Elmdale Ave., Glenville, IL 60025.

☐ Wooden toy parts and precision woodturning items such as wheels, dowel pins and axles. Also hobby plans for personal gifts and toys. Great for the home woodworker with prices low enough for even large-volume buyers. For information write: THE TOYMAKER SUPPLY CO., 105 Weiler Rd., Arlington Heights, IL 60005 or call toll-free 1-800-624-3938 (in IL 1-800-358-4208).

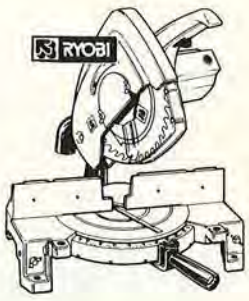
☐ The Total Shop multipurpose tool. It's a 10″ table saw, 34″ lathe, 16½″ drill press, horizontal boring machine and disc sander—five tools in one quality machine. 1½-hp motor develops nearly 3 hp! Send for our 30-minute video demonstration tape (VHS or Beta). Include $20 refundable deposit. TOTAL SHOP, Dept. Q1, P.O. Box 16297, Greenville, SC 29606.



☐ Special square drive assortments include 100 screws in each of six popular lengths, a hand driver, hex driver for use in a standard drill chuck and a set of six heavy-duty storage bins. #6 assortment: $16.54; #8 assortment: $19.47; #10 assortment: $27.49. MCFEELY HARDWOODS, P.O. Box 3, 43 Cabell St., Lynchburg, VA 24505. Call 1-800-846-2729 (in VA 1-800-542-2023).

☐ This 1″ belt sander with 8″ disc is an ideal addition to any workshop. The disc and belt sander tables tilt from 0° to 45°. Sand, grind, deburr, sharpen or polish any material. Complete with ½-hp motor. $119.95. Shipped ppd. INDUSTRIAL ABRASIVES CO., P.O. Box 14955, Dept. B, Reading, PA 19612 or call 1-800-428-2222 (continental US), 1-800-422-2292 (PA only).

☐ Is this the world's best joiner-planer? We think so and invite you to take a closer look! MiniMax's new FS-35 joiner-planer combines industrial quality with an affordable price that will appeal to professionals and amateurs alike. THE XYLOPHILES CO., 138 E. Loudon Ave., Lexington, KY 40505; 800-354-9083.



☐ This Ryobi 10″ power miter saw cuts up to 45°; slotted metal cutting table turns with the blade for accurate cuts. Positive stops at 90°, 22½° and 45° right or left. Electric brake stops blade in seconds; sawdust ejection system throws sawdust away from operator. $157. ABBEY TOOLS, 616 North Brookhurst St., Anaheim, CA 92801. Call toll-free 1-800-225-6321; in CA 1-800-252-2221.

The Bulletin Board

WOODWORKING FACTS, FACES AND FABLES

WATCH IT IN THE WOODS! SMOKEY THE BEAR TURNS ENFORCER

If careless woodcutting leads to a fire on federal and state forest lands, you could be in a heap of trouble with Smokey the Bear. Responding to last year's record rash of forest fires — more than in 1981-1984 combined — Smokey plans stern action rather than warnings for fire starters.

Both federal and state forestry officials will seek stiff fines, as well as payment for firefighting costs and even prison sentences, from deliberate offenders. And the careless won't be exempt, either. A Washington hiker already faces payment of $500,000 in actual costs for an accidental fire he started by burning toilet paper rather than burying it in the Wenatchee National Forest last summer.

TOOLS TELL A TALE

English historian W. L. Goodman speculates that throughout history the number of different tools a woodworker had was determined more by his society's cultural level than the actual chronological date. The higher the level, the more varied the work he was required to do. For example, a joiner in the Rome of the Caesars had a much more extensive tool set than his counterpart in a small English village of the Middle Ages.

The chart below, from Goodman's *The History of Woodworking Tools,* 1976, David Mckay Co., Inc., NY, shows tools in use during various historical periods. Note that man has always thought it necessary to cut, smooth, and bore wood!

WOODWORKER'S TOOLS THROUGHOUT HISTORY

TOOL	STONE AGE	BRONZE AGE	EARLY IRON AGE	GREEK AND ROMAN	DARK AGES	MIDDLE AGES	1600 TO 1800	1800 TO 1962
Axe	x	x	x	x	x	x	x	x
Adz	x	x	x	x	x	x	x	x
Knife	x	x	x	x	x	x	x	x
Chisel	x	x	x	x	x	x	x	x
Auger	x	x	x	x	x	x	x	x
Hand-saw		x	x	x	x	x	x	x
Cross-cut saw		x	x	x	x	x	x	x
Bow drill		x	x	x	x	x	x	x
Drawknife			x	x	x	x	x	x
Rule				x	x	x	x	x
Plane, smooth				x	x	x	x	x
Plane, jack				x	x	x	x	x
Plane, plough				x	x	x	x	x
Plane, moulding				x	x	x	x	x
T-axe					x	x	x	x
Breast auger					x	x	x	x
Brace						x	x	x
Plane, try						x	x	x
Plane, mitre						x	x	x
Plane, shoulder						x	x	x
Saw, fret						x	x	x
Saw, tenon							x	x
Spokeshave							x	x
Marking gauge							x	x
Breast drill								x
Screwdriver								x
Twist bits								x
All-metal planes								x
Metal brace								x

BAKING A BATCH OF WOOD WASTE

Dr. David Hon, a research chemist at Clemson University, says the U.S. generates about 350 million tons of wood waste a year. And with a Betty Crocker approach, Hon has hit on a way to use much of it.

He liquifies wood so that it molds like plastic. After baking, the end product becomes more durable than either wood or plastic, and it won't burn!

Hon's "wood plasticization" recipe calls for sawdust, chips, or other woody material, and chemicals that act like baking powder. After compressing the wood to a liquid, he spoons the mixture into a mold, then bakes it.

Although the scientist's baked wood hasn't become commercial yet, similar technology in Japan produces tough knife handles and floor coverings guaranteed for 20 years. At present, Hon's product costs about 25 percent more than oil-derived plastic. But higher oil prices would make his re-formed wood competitive since it comes from a renewable resource — our nation's forests.

A cigarette doesn't phase Dr. David Hon's plastic-like wood made from waste.

Photograph: Courtesy of Clemson University

SMOOTHS YOUR PATH EVERY STEP OF THE WAY.

When it's your job to undo in hours both the effects of time and generations of "home improvement," turn to the dependable power of a Ryobi Sander.

Whether you choose a compact orbital model or our top-of-the-line belt sander, we help you cut through layers of difficulty with speed and finesse. Excellent balance and perfectly placed handles make your job easier, on a Victorian staircase or a freshly cut sheet of plywood.

As for the results: don't be surprised by the sympathetic looks of people who think you did it all by hand. For the first step on the way to a smooth finish, visit your professional power tool dealer for a look at the complete line of Ryobi Sanders.

RYOBI®

Built for the real world.™

Bensenville, IL 60106
312-766-1621

TREES HAVE NIGHTMARES ABOUT THIS BLADE.

It's ferociously efficient.
Flawlessly engineered.

IT'S THE PIRANHA® CARBIDE-TOOTH SAW BLADE. FROM BLACK & DECKER.

The Piranha® carbide saw blade lasts up to fifty times longer than conventional steel blades. And outperforms both conventional carbide and steel blades alike.

CUTS FASTER, SMOOTHER THAN CONVENTIONAL CARBIDE BLADES.

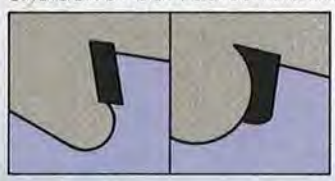
Carbide-tipped blades last longer than steel blades. But they tend to cut slower. Rougher. They're harder on the saw, and require more work of the operator.

To solve this problem, Black & Decker has engineered three major breakthroughs in carbide blade technology.

CURVED CARBIDE TOOTH "SLICES" THROUGH WOOD.

Most conventional carbide blades feature a somewhat clumsy block-shaped tooth (see diagram) which "chops" through wood, resulting in a slow, difficult cut.

The Piranha carbide tooth saw blade features an exclusive "curved carbide tooth," which literally slices through wood. Resulting in a faster, smoother cut than conventional carbide blades every time.



ORDINARY "BLOCK-SHAPED" CARBIDE TOOTH

PIRANHA® CURVED CARBIDE TOOTH

Also, by sharpening the tooth through an advanced process, Black & Decker has achieved an edge considerably sharper than that of conventional carbide blades.

The Piranha carbide tooth blade is even resharpenable, for extended life.

EXTREMELY FAST CHIP REMOVAL.

Another reason for the Piranha blade's ravenous appetite is its exclusive "fishhook gullet" design—a continuous curved surface with no break between the carbide tip and the steel body.

This continuous curved surface prevents wood from wedging beneath the carbide tip, reduces drag, and assures faster more efficient chip removal than conventional carbide blades.

THE RESULT: A CARBIDE-TIPPED FEEDING FRENZY.

Piranha carbide tooth saw blades are available now in a wide range of sizes, from 5½" to 10", 16 to 60 teeth, for all brands of circular, table, miter, and radial-arm saws. It's no wonder more and more professional job sites across the country are making PIRANHA the carbide blade of choice.

For detailed technical information, write, Black & Decker, 10 North Park Drive, P.O. Box 210-798, Hunt Valley, MD 21030.

The Piranha carbide tooth saw blade from Black & Decker. It may give trees nightmares. But to professional craftsmen, it's a dream come true.

BLACK&DECKER™

Piranha®

Carbide Tooth Saw Blade